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NOVEMBER 2025

DEMOCRATISING SAR

AIR TAXIS GET SET TO TAKE OFF IN THE GULF

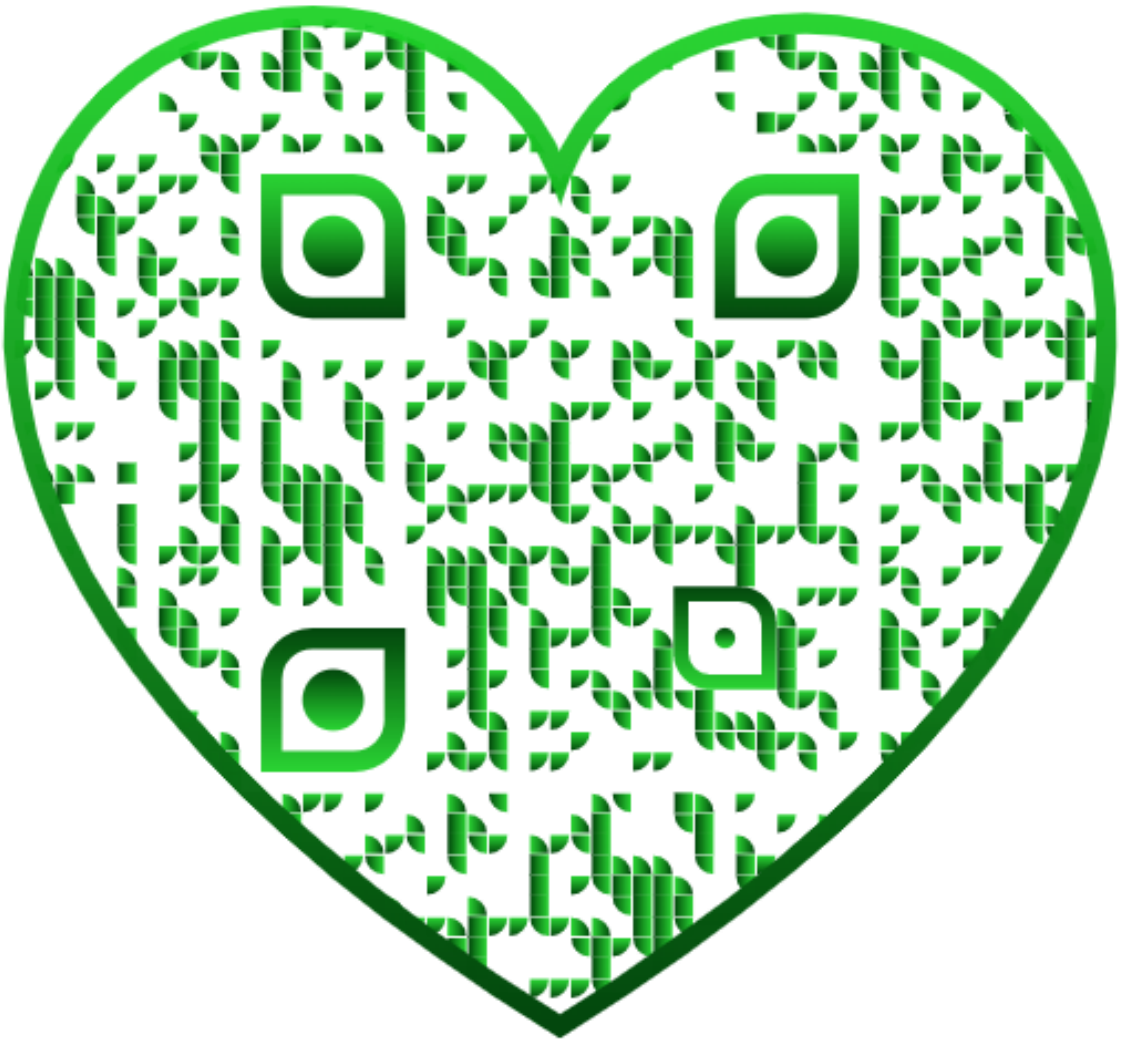
RECRUITING GEN Z

40

EMIRATES AT 40

EXCLUSIVE – A GIANT LEGACY
FOUNDER SIR MAURICE FLANAGAN'S PERSONAL ARCHIVES

ROYAL AERONAUTICAL SOCIETY



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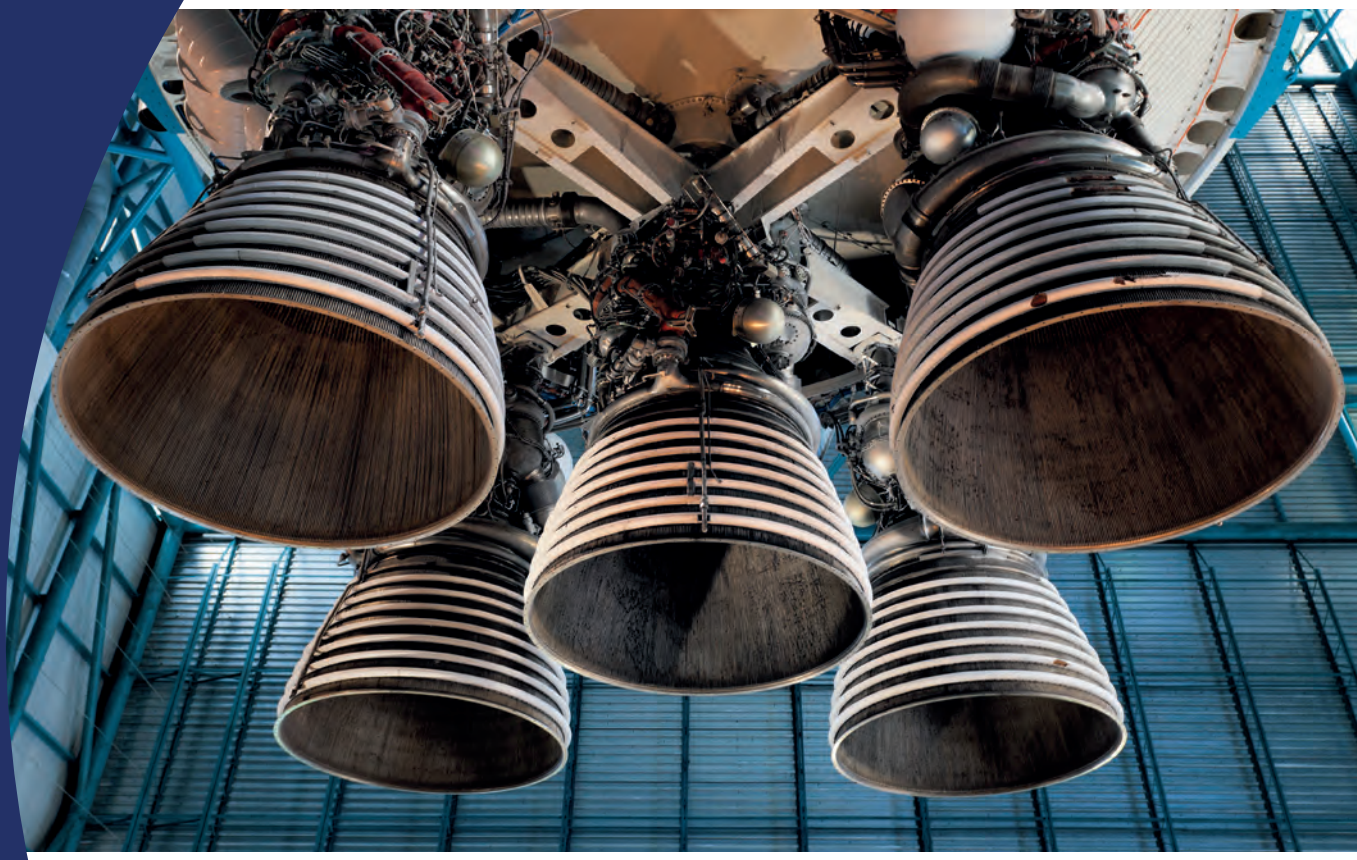

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AERO SPACE

Volume 52 Number 11
November 2025

EDITORIAL

A wise investment

The question of whether governments should back aviation winners is perhaps one that divides equally depending on the aircraft, manufacturer and the country involved.

Whether it is a brand-new airliner, eVTOL, fighter jet or space launcher – deep pockets are needed when developing revolutionary new technologies and getting them into the air, and it is nation states that have had not only the financial muscle (whether indirect or direct), but political heft and crucially, staying power.

As a case in point, last month the Airbus A320 family became the world's best-selling jet airliner, overtaking the Boeing 737 with a staggering 12,260 delivered. Some 7,000 orders are still in the backlog and one industry insider argues that this single aircraft family has 'made more than all other aerospace programmes in UK since the dawn of aviation.' With launch aid repaid through royalties on every wing made, this £249.3m investment in wing design and development has proved to be the ultimate example of picking an aeronautical winner. Yet the initial sales estimate was only 600 airframes and, with previous underwhelming airliners (BAC1-11 – 244 built, VC10 – 54 and Trident –117), many might have posited that the UK government would never see its cash back. Indeed, it was a certain Margaret Thatcher who reportedly said: "I don't want another Concorde on my hands," referring to the beautiful Anglo-French SST's sales flop.

Conversely, and explained wonderfully in Paul Beaver's new book, *Mitchell – Father of the Spitfire*, about aeronautical supremo, RJ Mitchell, sometimes governments may run in the opposite direction from world-beating technology – as when the RAF and Air Ministry pulled its support from the final Schneider Trophy race.

What then is the secret for government (and private investors) in choosing a winner? While technical knowledge should be taken for read – perhaps gut instinct, resisting single customer requirements and a vision of the future is equally important in picking a winner.

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Front cover: Emirates celebrates 40 years of excellence in 2025. (Wayne J Davis/RAeS)

AERO SPACE INSIGHT

Additional content is available to view online at: aerosociety.com/aerospaceinsight
Including: Rearming at pace – DSEI 2025, Failure to launch: the rise and fall of the UK Space Agency, Recruiting a next-generation air force – will Gen Z fight in WW3? The Apache's enduring reign and Building a resilient global aviation workforce at the 42nd ICAO Assembly.

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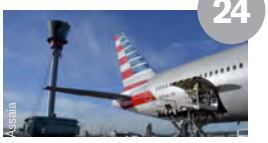

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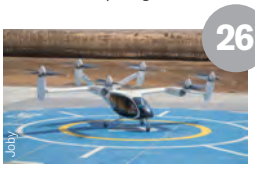

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Blueprint

Helsing CA-1 Europa

Length	36ft
Wingspan	32ft
Maximum Take-Off Weight	4t
Speed	'High subsonic'

Engine and payload

The CA-1 is powered by a single turbofan but no engine supplier has been announced yet. The intention is to develop a purely European sovereign supply chain and resilient industrial effort. The Europa features a modular internal weapons bay for air-to-air missiles, air-to-ground munitions or EW payloads.

Affordable mass

No exact cost of the CA-1 was forthcoming but Helsing says it will be a 'fraction' of the cost of a piloted fighter jet and, thus, be able to be procured and fielded in the hundreds. The CA-1 could be used as part of larger swarm tactics, or working as a 'loyal wingman' with crewed fighters.

Helsing AI

AI fighter aces trained in hours

At the heart of the CA-1 is Helsing's AI software which includes the Centaur air combat system. This uses 'self-play reinforcement learning' where AI agents learn by fighting against each other. The result is that Centaur AI can learn the equivalent of decades of human air combat experience in hours. The AI software has already been flown in BVR dogfight trials using Gripen E.

Innovation at pace

The CA-1 Europa concept was designed and built in just 14 weeks by a small team of Helsing and Grob engineers. A first flight is planned for 2027, with the company saying that it hopes to fly and test the drone from Grob's facility in Bavaria.

DEFENCE

Helsing reveals European CCA

On 25 September German defence AI start-up, Helsing AI unveiled with its airframer partner, Grob Aircraft, the CA-1 Europa, an all-European sovereign collaborative combat aircraft (CCA), designed to give Europe 'intelligent mass' in air combat and strike roles. Grob had previously been acquired by Helsing in June "to develop the next generation of capabilities for aerial warfare" with its experience in composites for its family of trainers. The attritable Europa will incorporate Helsing's cutting-edge Centaur AI software, which has already been tested in BVR air combat scenarios. Speaking at the reveal ceremony at Grob's factory and HQ in Tussenhausen Bavaria, Germany, which featured guests from industry, the Bavarian government, Luftwaffe, media and defence analysts, former Airbus CEO and Helsing board Co-Chairman, Tom Enders said that Helsing "has the potential to become the Airbus of the 21st Century." A first flight is set for 2027 with the potential for it to be in operational service in 2029.

Radome

AEROSPACE

Drone intruders disrupt flights in Europe

Airport operations across Europe have been disrupted by mystery drones in their airspace. Copenhagen Airport in Denmark and Norway's Oslo Airport were targeted by drones on the night of 22 September. Both airports suffered flight disruptions, with Copenhagen closing for four hours. Reports in Danish media suggest the UAVs may have been launched from ships with connections to Russia. On 2-3 October, Munich International Airport suffered two nights of flight suspensions triggered by drone activity. Airport officials said the disruptions led to 46 flight cancellations or delays, impacting around 6,500 passengers. The previous fortnight saw similar occurrences in Belgium and Romania with mystery drones detected near sensitive sites. The incursions come in the wake of a Russian UAV being shot down in Polish airspace.

GENERAL AVIATION

Laminar-flow bizjet lands launch customer

Otto Aerospace, a company developing more sustainable business jets, has named the launch customer of its Phantom 3500 as Ohio-based Flexjet. The deal, announced on 29 September, sees Flexjet purchasing 300 of the twin-jet with options for more. The first flight of the Phantom is expected in 2027 with deliveries starting in 2030, the company says. The windowless Phantom boasts significant fuel and drag reduction through its laminar flow technology fuselage and use of SAF. Otto is aiming to receive FAA Part 23 certification to allow it to enter service at the end of the decade.

DEFENCE

Sikorsky reveals Black Hawk UAS

At the Association of the US Army (AUSA) trade show in Washington DC in October, Lockheed Martin's Sikorsky unveiled the newest autonomous member of its Black Hawk family – the uncrewed S-70UAS U-Hawk helicopter. Based on a UH-70L, the U-Hawk swaps the cockpit section for clamshell doors and a ramp, with the firm saying it has 25% more cargo capacity that a traditional Black Hawk. Developed in 10 months, the S-70UAS uses Sikorsky's Matrix autonomous flight system. A first flight is set for 2026.

AIR TRANSPORT

Digital is fastest growing services segment

Airbus has released its latest market forecast for the services and support sector, predicting that the services sector is set to almost double to $311bn in value in the next 20 years. As well as fleet growth in the civil sector, the demand for digitalisation and connectivity will see a four-fold increase in connected aircraft by 2044. This demand for digital services such as predictive maintenance and AI will see this segment grow from $9bn today to $26bn by 2044. To support this expansion in airline fleet, maintenance and services, Airbus also predicts that the aviation industry will need 2.35 million new professionals by 2044, including 633,000 pilots, 705,000 technicians and 1.01 million cabin crew. (See 'Attract, recruit, train, retain' p30).

NEWS IN BRIEF

A United Airlines' flight from Denver to Los Angeles on 16 October was forced to make an emergency landing at Salt Lake City International Airport after an object smashed the Boeing 737 MAX's cockpit windshield. The incident occurred at 36,000ft. A Californian start-up, WindBorne, has now admitted that one of its high altitude weather ballloons may have hit the aircraft.

Both Air Austral and Egyptair have announced plans to retire their fleets of Airbus A220 airliners due to ongoing problems with their Pratt & Whitney geared turbofan (GTF) engines. The GTF has been hit with a series of problems related to premature component wear and excessive maintenance times.

Three Russian MiG-31 Foxhound fighters entered Estonian airspace on 19 September for approximately 12 minutes. Italian F-35s based in Estonia scrambled to intercept the jets, with the violation coming just days after Russian drones breached Polish airspace. Estonia claims this was the fifth Russian violation of its airspace this year.

NASA leadership is under scrutiny after Acting Administrator Sean Duffy says he will open up competition for the lunar lander contract, due to SpaceX falling "behind" with Starship, in the hope that the US stays on top of the Moon race against China. Furthermore, Duffy has alluded to the prospect of NASA folding into the DoT, withdrawing it as an independent agency.

Phoenix-based, SyberJet Aircraft has started development of the nine-seat, single-pilot SJ36 light jet. Developed from the Swearingen SJ30 that first flew in 1991, the new aircraft has a 4ft-longer cabin. With a range of 3,500 miles and cruise speed of Mach 0.88, the $14m jet is marketed at those wanting to fly from LA to Hawaii or Washington DC non-stop. Flight testing is expected to begin in 2027 with first deliveries planned for 2032.

Beijing company, SAWES Energy has begun testing

AIR TRANSPORT

Pan Am/AVI8 Capital

Pan Am to take to the skies again?

One of the world's most iconic airline names may be returning to the skies after aviation bank consulting firm, AVi8 Air Capital, working with Pan American Global Holdings, announced it had initiated the procedure with the US FAA to recertify Pan Am as a Part 121 scheduled carrier ahead of relaunching operations. If approved, the new Pan Am will be based in Miami and, unlike the original carrier, will operate an all Airbus fleet.

DEFENCE

UK to assemble US Wedgetail prototypes

During the state visit of US President, Donald Trump to London in September, it was announced that the UK is to produce the first two E-7A Wedgetail AWACS aircraft for the USAF. The project to convert the Boeing 737 airframes will take place at STS Aviation Services in Birmingham and is expected to create around 150 jobs and inject more than £36m into the British economy. It will be the first time the UK has delivered a complete military aircraft to the US since the USMC purchased the original Hawker Siddeley Harrier in the 1970s. The USAF plans to acquire 26 Wedgetails to replace its E-3 AWACS aircraft from 2027. The first of three E-7 Wedgetails for the RAF will be delivered in 2026.

SPACEFLIGHT

ESA funds reusable Starship lookalike

ESA has awarded Italian rocket developer, Avio €40m for 24 months to develop a reusable upper stage demonstrator. The announcement took place on 29 September during the International Aeronautical Congress in Sydney, Australia. The funding will go towards assessing the requirements, design and technology for ground and flight segments required for a reusable upper stage demonstrator, according to ESA. Notably, the image of the proposed design of the rocket resembles SpaceX's Starship. The contract is part of the second Phase of ESA's plan to operate reusable rocket technology, following phase one in March 2024. A graphic detailing the design shows a P120C as the first stage, which is used to power the Vega C and as strap-on boosters for the Ariane 6 rocket, under a Starship-like reusable upper stage.

AEROSPACE

EHang unveils autonomous lift-and-cruise eVTOL

EHang

On 13 October, Chinese advanced air mobility developer, EHang unveiled its next product – the VT35 – a two-seat pilotless eVTOL. Building on experience with the autonomous EH216-S eVTOL and the VT30, the tandem wing lift-and-cruise VT35 features a range of around 200km and is designed to link cities within a 'one-hour flight zone.' It can also use existing EH216-S vertiports. Already in flight test, the VT35 has conducted the first transition to forward flight milestone.

an inflatable flying wind turbine. Comprising a main airfoil and a helium-filled annular wing that forms a 130ft diameter duct, SAWES claims the 12 generators within it will produce 1MW of power at a cost 30% lower than normal masts. This power is then transmitted to the ground via the tethering cable.

Uzbekistan Airways has placed the single largest order in the airline's history as part of plans to modernise its long-haul widebody fleet. The flag carrier plans to acquire up to 22 more Boeing 787-9 Dreamliners, with the deal consisting of 14 firm orders and eight options. The carrier already operates the 787 to locations in Europe, Asia and the US.

The German Bundestag has approved the €3.75bn purchase of 20 additional Eurofighters announced at the 2024 ILA Berlin event. The Tranche 5 aircraft will be equipped with the new AESA radar and delivered between 2031 to 2034.

NASA's ten new astronaut candidates were revealed on 22 September, following a competitive selection process of more than 8,000 applicants. The class now will complete nearly two years of training before becoming eligible for flight assignments, supporting future science and exploration missions to low Earth orbit and, potentially, the Moon and Mars. The ten candidates are: US Army CW3 Ben Bailey, USAF Maj Cameron Jones, Katherine Spies, Anna Menon, US Navy Lt Cmdr Erin Overcash, USAF Maj Adam Fuhrmann, Dr Lauren Edgar, Yuri Kubo, Rebecca Lawler and Dr Imelda Muller.

Texas Southern University (TSU) has become the first university aviation school to buy Cirrus trainers with the 'Safe Return Autoland' system. TSU will receive seven SR20s featuring the system that allows passengers to press a single button to command the aircraft to autonomously land at the nearest suitable airport and automatically shut the engine in case of pilot incapacitation.

Radome

AEROSPACE

Rolls-Royce to test narrowbody UltraFan

Rolls-Royce has been selected by the EU's Clean Aviation programme to lead one of 12 new projects aiming to decarbonise aviation. The Ultra Novel and Innovative Fully Integrated Engine Demonstrations (UNIFIED) consortium is led by Rolls-Royce and contains industrial, academic and research partners in France, Germany, the Netherlands, Norway, Spain and the UK. The project will involve building and ground testing Rolls-Royce's UltraFan demonstrator scaled for narrowbody requirements. The UltraFan 30 will be in the 30,000lb thurst range, compared with the original 80,000lb thrust UltraFan – now designated the UltraFan 80.

Rolls-Royce

AIR TRANSPORT

Spirit downsizes fleet, furloughs pilots

After filing for bankruptcy for the second time in a year, US-based Spirit Airlines is restructuring by cutting its fleet by more than half, with plans to shrink it to 100 aircraft. The low-cost carrier's CEO, Fred Cromer, said on 3 October during a meeting with creditors, it currently operates 214 aircraft and is aiming to save the company "hundreds of millions of dollars" by reducing the fleet size and reject an additional 87 aircraft leases. The company also plans to furlough another 365 pilots and will downgrade the seniority of 170 pilots, as well as cut 1,800 cabin crew as part of its restructuring and downsizing. Meanwhile, the company has recently announced it will axe around 40 US routes that are underutilised as part of the restructuring process.

SPACEFLIGHT

Dream Chaser to conduct 'free-flying' orbital mission in 2026

Sierra Space's Dream Chaser reusable cargo spaceplane is to conduct a 'free flying' demonstration flight to orbit amid growing questions about whether the delayed spacecraft, one of three ISS commercial craft with SpaceX Dragon and Northrop Grumman's Cygnus, will have enough time to perform the previous seven contracted missions for NASA before the space station de-orbits. In a revision to the Commercial Resupply Services contract announced in September, NASA has now said it "is no longer obligated for a specific number of resupply missions" and instead will base its decision on a successful demo flight by Dream Chaser.

GENERAL AVIATION

Fallen Angel causes drone chaos

UK-based Altitude Angel, which provides uncrewed traffic management (UTM) services for drone operators across the world entered administration on 7 October. Most famous for its Drone Assist app technology that is used by recreational and commercial drone operators for flight planning, the company also provided services to BVLOS programmes, including the UK's Project Skyway and the EU's SESAR Joint Undertaking. Its Approval Services platform is also used in 40% of the UK's airports and aerodromes to enable drone operations.

NEWS IN BRIEF

Marshall Aerospace has abandoned plans to move from its long-term home at Cambridge Airport to Cranfield. While no official reason has been given, local Cranfield councillor, Sue Clark said on social media that it is "no longer financially viable." The relocation had been approved in 2023 and was expected to bring 1,200 jobs to the Cranfield area and create new opportunities for research and innovation.

Sweden's Braathens International Airways has filed for bankruptcy, causing the cancellation of charter flights for a number of tour operators. Created in 2022 as a spin-off of ATR-72 operator, Braathens Regional Airlines, the new airline operated a fleet of two Airbus A319s and three A320s. The ATR side of the business is unaffected. Meanwhile, Icelandic low-cost carrier, PLAY Airlines announced it was ceasing operations with immediate effect on 29 September.

The RAF's MQ-9 Reaper RPAS made its final operational flight on 3 October after 18 years of service. The UAV is being replaced by the MQ-9B Protector, which officially entered RAF service in June 2025. The Reaper UAV entered service in October 2007 and was utilised mostly in Afghanistan and in anti-ISIS missions during Operation Shader, and in total flew in excess of 173,000 flying hours in almost two decades, according to the RAF.

On 13 October, SpaceX conducted a successful flight of the Starship/Super Heavy rocket – with the Starship upper stage making a water landing in the Indian Ocean after being launched from Texas. The launch was the last flight of the Version 2 vehicle, with SpaceX now moving to the 5ft taller Version 3. An even larger and more powerful Version 4 is set to launch in 2027.

The latest veteran aircraft to be updated and relaunched for the modern era is the Thurston Lake Amphibian. Designed in the 1940s and relaunched in the 1970s as the Thurston Teal, David Thurston's design has now been reborn as the Thurston TA16 Seafire.

The UK Department for Transport has awarded

DEFENCE

US moves air power assets to Caribbean

Ahead of possible military action against the government of Venezuela for allegedly harbouring narco-terrorists, the US Pentagon has been bolstering its forces in the Caribbean over the past two months. A squadron of ten USAF F-35A fighters are now based at José Aponte de la Torre Airport, Puerto Rico, with MQ-9A Reapers and an AC-130J Ghostrider gunship also observed at the same airbase. A US Marine Expeditionary Unit, with 4,500 marines and warships, including the USS *Iwo Jima* amphibious assault ship with AV-8B Harriers and MV-22s, are also now in the Southern Command theatre. The US ratcheting up on pressure has also seen US forces sink alleged drug boats originating from Venezuela since September.

SPACEFLIGHT

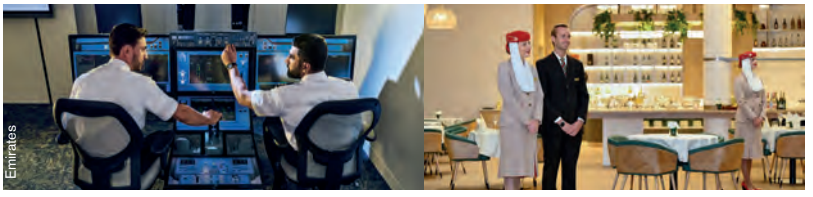
‘Same-hour’ global delivery via orbit

Inversion Space

Californian start-up Inversion Space has revealed the Arc spacecraft that it says will make ‘same-hour’ global delivery a reality. The company says 4ft by 6ft Arc, which it describes as “the world’s first orbital delivery vehicle,” will be able to drop 500lb of cargo to almost any point on Earth in less than an hour. The concept sees the spacecraft parked in low Earth orbit with a pre-loaded cargo, waiting for a signal to re-enter the atmosphere. It then uses its lifting body design to steer towards its destination and then parachute to the drop zone. Inversion Space suggests the system could be used to deliver supplies to a battlefield or aid to a disaster zone cut off from traditional supply.

AIR TRANSPORT

Emirates soars higher with two new training centres


Emirates

Emirates has opened two new training centres, one for pilot training and the other an $8m cabin crew centre of excellence. The new $135m pilot training centre with six simulators will expand capacity by 54% and train pilots for its Airbus A350s and upcoming Boeing 777Xs. Meanwhile, the airline also launched a new cabin crew training centre focused on “mastering hospitality excellence.” The facility inspired by Michelin-star standards, covers fine dining procedures and high-level guest engagement. The carrier says more than 10,000 cabin crew are expected to complete training at the Emirates Centre of Hospitality Excellence by the end of the year.

AEROSPACE

COMAC trims C919 delivery targets

China’s aircraft manufacturer, COMAC, has cut the original annual delivery target of its C919 from 75 down to 25, according to *Bloomberg*. The company has only delivered five aircraft as of September. COMAC has grappled with several delivery setbacks, such as the previous export ban of the aircraft’s CFM engines – which was lifted in July – and its slow progress in attracting foreign customers. However, in September, AirAsia CEO, Tony Fernandes said the Malaysian low-cost carrier was “in active discussions to buy the C919.” This would make AirAsia the first foreign customer for the narrowbody airliner.

£4.4m of funding to British firms developing next-generation aviation technology. As part of the Future Flight Programme, delivered by Innovate UK, the funding will support projects, including Beyond Restoration which aims to use long-range, heavy-lift drones to deliver environmental materials to remote areas. Also benefiting is the London Health Bridge Project, which uses drones to deliver medical samples and will use the funding to scale up from 1,000 to 50,000 hospital and clinic deliveries per month.

Specialist regional aircraft lessor, TrueNoord has placed a firm order for 20 Embraer E195-E2s. The deal also includes purchase rights for 20 additional E195-E2s and up to ten E175-E1s. The deal is worth $1.8bn at list prices.

Sweden has become the latest customer of Embraer’s C-390 Millennium aircraft, after signing for four of the type on 6 October. The deal also includes seven additional purchase options and is under the trilateral partnership with Austria and the Netherlands, which collectively ordered nine in 2024.

During testing ahead of a launch on 29 September, Firefly Space’s two-stage Alpha rocket suffered an anomaly that saw the booster stage engulfed in flames. Firefly disclosed the customer for the intended mission, which was set to launch from Firefly SLC-2, Vandenberg Space Force Base in California this quarter, was Lockheed Martin. The event took place at the company’s test stand in Briggs, Texas.

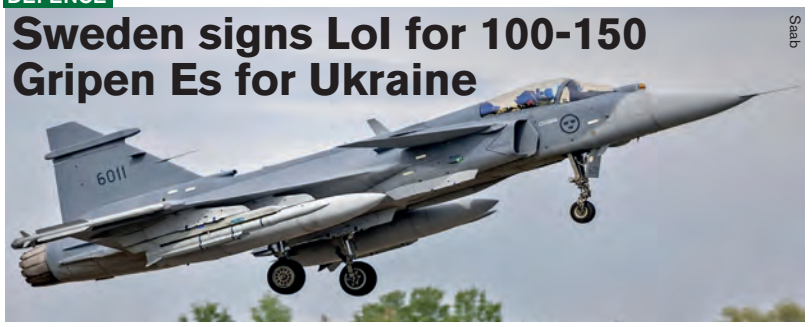
Gulfstream has announced a brand-new ‘super midsize’ bizjet. The ten-seat G300, which is set to replace the G280, also has a projected range of 3,500 miles and is reported to have performed its maiden flight in August.

GE Aerospace has flown its Atmospheric Test of Launched Airbreathing System (ATLAS) at supersonic speeds during captive carry tests aboard a vintage F-104. The solid fuel ramjet (SFRJ) was mounted below the wing for three test sorties as part of the programme, which aims to extend the range of current munitions.

Radome

DEFENCE

Sweden signs LoI for 100-150 Gripen Es for Ukraine



Saab

On 22 October during a visit by Ukrainian President, Volodymyr Zelenskyy to Linköping Sweden, Swedish Prime Minister Ulf Kristersson announced the signing of a Letter of Intent for defence co-operation – which includes the potential export of 100-150 Saab Gripen Es as part of a long-term plan to rebuild the Ukrainian Air Force.

● Meanwhile, earlier that week on 20 October, the Swedish Air Force (SwAF) received the first (above) of 60 Saab JAS39 Gripen Es to its F7 Skaraborg Air Wing.

GENERAL AVIATION

UK EMS operators call for return of EGNOS

Air Ambulances UK, the national organisation supporting the work of the UK's 21 air ambulance charities, has published a manifesto. The *Critical Moments, Lifesaving Decisions* document calls for the safeguarding of 24/7 helipad access at all hospitals, unlocking access to patient data and strengthening public understanding about how air ambulances are funded. Crucially, it also calls for the CAA to temporarily restore the use of the European Geostationary Navigation Overlay Service (EGNOS), which the UK lost access to following Brexit. Temporary access would "overcome weather and visibility issues [and] reduce delays or cancellations," said Air Ambulances UK.

AEROSPACE

VoltAero placed in administration over cash crunch

France's VoltAero, developer of the hybrid-electric Cassio aircraft was placed in administration by La Rochelle Commercial Court on 7 October, after being declared bankrupt in late September. The funding problems arose when one of its two main investors, France's ACI Groupe, itself ran into investment problems. According to the court, VoltAero has until the end of November to come up with a restructuring plan. VoltAero, which unveiled a redesigned version of its Cassio 330 aircraft at the Paris Air Show in June, was expecting the aircraft to make its first flight in 2026.

● Meanwhile, hydrogen propulsion pioneer, ZeroAvia has warned that, if it is not successful in attracting Series D investment, it lacks the resources to continue beyond the first quarter of 2026.

AIR TRANSPORT

Turkish delights Boeing with widebody order

Turkish Airlines

Turkish Airlines has announced a firm order of 75 787 Dreamliner aircraft, marking the carrier's largest Boeing widebody order. The order will be split between 35 787-9s and 15 787-10s, with options for 25 more in the future. The flag carrier already operates 24 787-9s, with more than 40 on order, including this month's announcement. Furthermore, the company said it intends to purchase up to 150 more 737 MAX jets, which would also be the airline's largest Boeing narrowbody order ever. Turkish Airlines is pushing to operate 800 aircraft by 2033.

NEWS IN BRIEF

Indian carrier, IndiGo has ordered 30 more Airbus A350-900 airliners by finalising an MoU. This brings its total A350s on order to 60 aircraft.

Lockheed Martin has revealed a new concept for an uncrewed 'loyal wingman' collaborative combat aircraft, the Vectis. Developed by the company's Skunk Works division, Vectis is an affordable Group 5, non-attritable and low-observable platform, designed to work alongside the F-35 and other platforms.

ESA has selected its 11th Earth Explorer mission, called WIVERN, which will study wind measurements within clouds. WIVERN, short for WInd VElocityRadar Nephoscope was chosen above 14 other proposals and was formally selected by ESA on 23 September.

UK firm, Windracers has received CAA approval to launch the country's first international BVLOS UAS flights. The Windracer ULTRA drone is now permitted to leave UK airspace, allowing flights connecting Tingwall Airport in the Shetlands to Haugesund Airport in Norway. A temporary danger area will be created to provide a corridor of airspace around the 235 mile overwater flight.

ON THE MOVE

After seven years, Virgin Atlantic CEO, Shai Weiss is to stand down on 31 December 2025. He is succeeded by Corneel Koster.

Peter Foster is to retire as CEO of Air Astana in March 2026 after 20 years at the helm of Kazakhstan's flag carrier. The airline's CFO, Ibrahim Canliel, will become the new CEO.

The UK's new National Armaments Director is Rupert Pearce, who was previously CEO of satellite telecoms company, Inmarsat.

Boeing has announced that Sir Jeremy Quin will be the New President of Boeing UK & Ireland, succeeding Maria Laine, effective 21 November. Meanwhile, Thom Breckenridge is MD of Boeing Defence UK.

DEFENCE

Defence firms eye potential attack helicopter CCAs

Tim Robinson FRAeS

On 14 October, Boeing unveiled its Collaborative Transformational Rotorcraft tiltrotor.

With new concepts for fixed-wing Collaborative Combat Aircraft (CCAs) appearing, such as Helsing's Europa CA-1 (see BLUEPRINT, p4) and Lockheed Martin's Vectis, attention is also turning to providing a 'Loyal Wingman' for rotary-wing applications – particulary for the attack helicopter role. As well as the traditional small arms, AAA, MANPADs, SAMs and fighters, the threats to battlefield helicopters now include first-person view or autonomous combat drones – with videos from Ukraine showing choppers being brought down in this way.

While there is an effort to have attack helicopters stand-off further away from the most dangerous threat zones with either longer-range missiles, such as Spike NLOS (Non-Line Of Sight), double the range of Hellfire or JGAM, or miniature effectors to scout ahead – replacing weapons on stub wings with air-launched ISR drones also reduces the amount of firepower that can be carried by a single platform at a time when combat mass is badly needed.

Pairing attack helicopters with drones is not new, via MUM-T (Manned-Unmanned Teaming), but previously these have been fixed-wing tactical UAVs – such as the US Army's Grey Eagle that has been paired with the AH-64 to provide additional eyes and scout ahead, the drawback being increased cockpit workload. Already an issue in two-seat attack helicopters, this has increased with the need to manage sensors and control another platform. However, since the emergence of the MUM-T concept over a quarter of a century ago, the exponential improvements in AI and autonomous systems means that attack helicopter CCAs, for the dangerous, cluttered and low-level mission in contested environments are now feasible.

In August, the British Army released details to industry that it is seeking an autonomous collaborative platform (ACP) to operate with its AH-64E Apache attack helicopters in a "highly autonomous, 'commanded not controlled' manner."

Richard Drake, General Manager of Auduril UK at its central London HQ with the Roadrunner counter-UAS reusable missile. The company currently employs around 70 staff but is looking to expand further in the UK with a factory and potentially an R&D centre.

Boeing reveals tiltrotor CCA

Meanwhile, on 14 October at the Association of the US Army exhibition in Washington DC, Boeing revealed a new concept for an autonomous tiltrotor – the Collaborative Transformational Rotorcraft (CxR). This is designed to operate with the US Army's Apache and Chinook helicopters, as well as other platforms across other services. With a tiltrotor, the CxR would also have the speed and range of a fixed-wing aircraft, giving greater capability and flexibility. Boeing sees this modular tiltrotor as coming in two main variants, a Collaborative Combat Rotorcraft (CCR), designed to provide additional weapons and ISR for Apaches, and a Collaborative Logistics Rotorcraft (CLR) to complement Chinooks for tactical resupply in the most dangerous environments. The adaptable airframe would have a payload capacity of 1,000-2,000lb and be able to carry sensors, weapons, air launched effects or electronic warfare kit.

Anduril UK targets British Army ACP

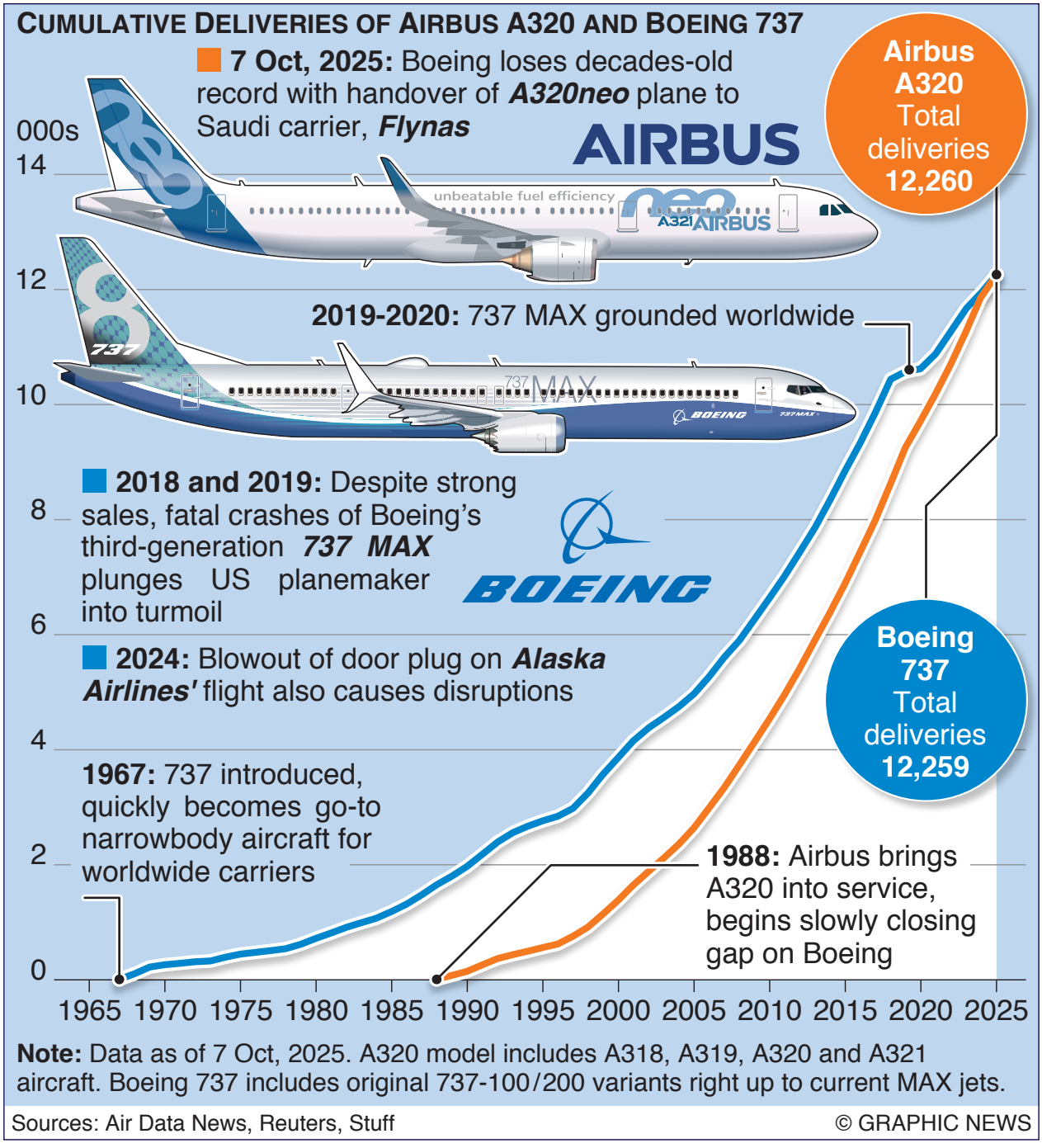
Meanwhile, the UK arm of US AI defence drone start-up, Anduril has also revealed that it will be bidding for the British Army's ACP (Autonomous Collaborative Platform) requirement for a 'Loyal Wingman' to accompany its AH-64E Apaches into battle. It has already partnered with eVTOL airframer, Archer to explore opportunities for civil and military autonomous aircraft within the UK. Speaking to *AEROSPACE*, Richard Drake, General Manager of Anduril UK, noted of eVTOLs: "If you think of the principle of these things, they're a great basis to build a really good vehicle from." Drake was coy about the design and specifications of the Anduril ACP under development but notes that it will be large enough to carry an equivalent weapon load to a crewed Apache. Because of autonomony and attritability, he says, it could also have the capability to carry a larger payload of short-ranged weapons, such as cheaper rockets that a piloted attack helicopter would not be able to risk. Hints Drake: "CGS came out with this 'I want to double or triple lethality in a short space of time.' Well, the easiest way to count how you double and triple lethality is how many missiles have you got on your helicopter, or how many missiles you've got when you've got a loyal wingman craft next to it," adding "you can really load up the lethality but not necessarily load up the price." Says Drake: "This land ACP is something that is right up our street. It's exactly where we can add value." With Anduril in the US also developing a fixed-wing CCA for the USAF via its Fury, Drake says "we'd love to be part of any UK ACP or CCA" as the RAF develops its requirements.

By the Numbers

Understanding the world of Aerospace through data

Airbus A320 flies past Boeing 737

Europe's Airbus A320 family of aircraft has overtaken the Boeing 737 to become the most-delivered jetliner in history


CUMULATIVE DELIVERIES OF AIRBUS A320 AND BOEING 737
7 Oct, 2025: Boeing loses decades-old record with handover of A320neo plane to Saudi carrier, Flynas
AIRBUS
unbeatable fuel efficiency
neo
A321 AIRBUS
Airbus A320 Total deliveries 12,260
000s
14
12
10
8
6
4
2
0
2019-2020: 737 MAX grounded worldwide
737 MAX
BOEING
2018 and 2019: Despite strong sales, fatal crashes of Boeing's third-generation 737 MAX plunges US planemaker into turmoil
BOEING
2024: Blowout of door plug on Alaska Airlines' flight also causes disruptions
Boeing 737 Total deliveries 12,259
1967: 737 introduced, quickly becomes go-to narrowbody aircraft for worldwide carriers
1988: Airbus brings A320 into service, begins slowly closing gap on Boeing
1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025
Note: Data as of 7 Oct, 2025. A320 model includes A318, A319, A320 and A321 aircraft. Boeing 737 includes original 737-100/200 variants right up to current MAX jets.
Sources: Air Data News, Reuters, Stuff
© GRAPHIC NEWS

Pushing the Envelope

Exploring advances on the leading edge of aerospace

Robert Coppinger

Recyclable and self-healing composites

Aircraft structures must be light, strong and resilient to withstand the harsh forces they experience in the wind speeds and temperatures of flight.

Composite materials have long been used for structural parts to deliver a lighter weight, stronger and more resistant performance than metals or wood. For high-performance aeronautical engineering, fibres in a resin is the composite of choice with the fibres normally being carbon, glass or an aromatic polyamide known as aramid. The resin for these fibres, which may be arranged in one or multiple directions for strength, is a polymer that is either a thermoset or a thermoplastic. While composites have been an effective solution for civil and military aircraft, they share one weakness with aviation's first material, wood: delamination.

A new solution

Internal damage, whether it is a fracture or a splitting apart of layers, will undermine a structure's integrity. A solution that industry has been seeking for decades is a self-healing material that reacts to damage to mitigate its effects. Aerospace engineering and materials science researchers from Texas A&M University, funded by the Department of Defense, have been testing the mechanical integrity of a carbon-fibre plastic composite called Aromatic Thermosetting Copolyester (ATSP).

The work has been led by the university's Nanostructured Materials Laboratory Director, Aerospace Engineering Professor, Dr Mohammad Naraghi, in collaboration with the University of Tulsa's College of Engineering & Computing Science Dean, Dr Andreas Polycarpou. They say ATSP can recover its shape and self-heal.

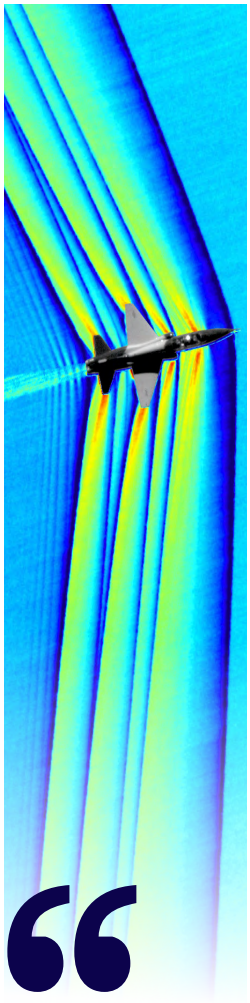
Developed by the Texan firm, ATSP Innovations, the universities are now testing it for aviation applications. The material is also of interest because, according to Texas A&M, ATSP is recyclable, solving the problem of disposal for aerospace composites.

The key aspect of ATSP is that its plastic component is a vitrimer, which means it is a polymer with the properties of a thermoset and a thermoplastic. A thermoset consists of small molecules that are not connected to one another and, through a curing process, become small chains of molecules that crosslink. The curing uses a chemical agent to initiate the molecule cross linking to solidify the polymer, and this is triggered or accelerated with the application of heat and/or pressure. When the thermoset curing ends, the small, linked chains of molecules persist, giving the material the properties it has. With a thermoplastic, polymer chains – a network of atoms connected to one another – can be loosened with heat and, thus, the material deforms. However, when you cool it down, it goes back to the polymer chain structure. A vitrimer is treated with a curing process so in that respect it is like a thermoset. However, the bonds between its polymer chains that are formed can be broken and reformed, like a thermoplastic, and this enables it to change shape and heal itself.

Naraghi sees ATSP as a potential replacement for what he calls the aerospace industry's "legacy" composites. ATSP is also several times stronger than steel but lighter than aluminium and the ongoing studies are investigating structural components for aircraft. Naraghi refers to the "ability of the material to exchange bonds," to form new linkages between its polymer chains in temperatures as low as room temperature, as the key to its ability to heal itself. If stress causes an internal rupture or a crack, new linkages will form, and the material will retain its performance characteristics. The ATSP panels tested for these properties are about 15-20cm/sq, so they are not potential structural components.

As the work continues, Naraghi and his colleagues will examine the material's science and its applications. To improve ATSP, the Texas A&M and Tulsa researchers are studying how the vitrimers' thermoplastic qualities can minimise the curing processes' shrinkage stresses that reduce structural performance. For the applications, they are examining vitrimer compatibility with the legacy carbon-fibre composites. This is so it can be used for repairing those legacy carbon-fibre composite structures.

"I see it really as a stepping stone between an airplane that is totally made out of vitrimer composites and a traditional fibre-reinforced epoxy composite," Naraghi said.



"IF STRESS CAUSES AN INTERNAL RUPTURE OR A CRACK, NEW LINKAGES WILL FORM, AND THE MATERIAL WILL RETAIN ITS PERFORMANCE CHARACTERISTICS

LETTERS

Local council to quietly demolish British aviation history

In August this year a great wrong was corrected with the dedication of a beautiful on-site memorial to the seven crew members that perished when RAF Short Stirling LJ630 crashed at Stanton-by-Dale, Derbyshire on 31 August 1944.

In one of those stranger-than-fiction occurrences the aircraft came down less than half a mile from 3 Lows Lane, one half of a very anonymous pair of semi-detached houses somehow managing to exist amidst the fire and fumes of the nearby Stanton Ironworks.

Nowadays, the Ironworks are long gone but a small blue plaque sets the house apart from the recycling plants and used truck dealerships. It marks the birthplace of Hugh Oswald Short, one of the three brothers that founded Britain's first aircraft manufacturing company and an Honorary Fellow of the RAeS.

Following the death of its last owner, the house has been snatched up by the owners of nearby Stanton Park, a vast new 200-acre industrial development that swallows history, pride and the local landscape without so much as a burp.

In an outstanding act of municipal and aeronautical vandalism, the local authority – Erewash Borough Council – has bent the knee to corporate greed and on 27 August unhesitatingly approved a demolition order for Short's birthplace.

Is anyone else outraged? An increasing number of people here most certainly are.

Paul Harvey
paul@icarusmedia.com

Fundamental health and hope in aerospace

When I read about the RAeS Mental Health in Aerospace Awareness event on 6 October, I was shocked at the scale of this genuinely profound issue, which exists largely hidden in plain sight.

The experience of aircrew is hugely sobering when you contemplate the range of factors that combine to create a less than ideal state of being for many. Sleep impairment, regularly disconnecting and reconnecting with home, experiencing depression and anxiety and – equally troubling – feeling so little trust in 'the system' that suppressing the truth feels preferable to speaking honestly and openly with experts or colleagues for fear of losing identity or income is devastating to read.

Having experienced severe sleep deprivation which, combined with multiple factors, created the most imperfect storm, not once, but twice, I am extremely fortunate to have survived and recovered. As an independently minded, creative human being, a significant amount of pain experienced during this severe illness was the well-meant intent of others, including by a number of experts.

I hope that anyone reading this who is struggling makes time to listen to their own instincts, as well as the words of others. Some of my accelerated recovery was led by the unexpected.

I would like to offer two insights to support your important work in this area. Firstly, please carefully consider the use of words, replacing those that diminish with those that offer hope and lift. The word 'mental' is loaded with stigma, creating unhelpful fear and avoidance. I advocate a change to 'fundamental health,' which more accurately and respectfully reflects the nature, status and impact of these conditions.

Secondly, suppressing the truth kept me metaphorically grounded much longer than was ideal, so I offer much credit to all who encourage open dialogue to improve the lives of all concerned.

In this fast-changing world, unconventional, unorthodox thinking, collaborative working and open dialogue are essential. At a personal level, I founded the STEMtoSTEAM Supper Series seven years ago, seeking greater equality for the arts and wider creativity, while exploring whether a genuine appetite existed to change policy, perceptions and funding. From the start of my quest it has been a genuine revelation that the consistent support has straddled every sector, including the worlds of medicine, engineering, education, environment, law and aviation.

RAeS President, Alisdair Wood's wise and much welcomed words in the October *AEROSPACE* magazine that there is "a real need to balance technical expertise with creativity, critical thinking and a passion for problem solving," are spot on, as was his statement that "the aerospace sector is facing a growing need for a new generation of skilled, diverse and visionary talent."

Everything that I have learnt over this seven-year period endorses this with a further request that skilled, diverse and visionary talent that is already 'here' in today's world is embraced on equal terms alongside conventional expertise and organisations.

Carole Bent

Will Gen Z fight in WW3?

Response to 'Recruiting a next-generation air force – will Gen Z fight in WW3?'[1]

Matthew Smith I argue that you will always find enough idealistic young people to stand up and fight, as Ukraine has proved. Historically, there are stories about veterans of WW1 who claimed the next generation would not be able to fight a war. That generation became the WW2 veterans who then claimed that the youth of their day would not be able to fight a war like they did – but who went on to become Korean War veterans – and so it continues.

Adam Estes As a member of Gen Z, I would say that if people of any country were directly attacked in a clearly unprovoked way, I think people of my generation in that country would be more than willing to fight, especially for the principles we hold dear. That being said, I think many of the younger generation that have had access to mass media have been sceptical (at best) about war adventurism, or feel that they would not go to war if they were to make a few already rich people even more wealthy and powerful than before the war. I also think that social media platforms allowing users to see content created by people around the world (or to directly and instantly interact with such people) will make it harder for politicians and recruiters to demonise people from an adversary nation.

Memcom awards

Response to 'The RAeS was Highly Commended as 'Best Professional Body or Learned Society' at the Memcom awards – we lost out to the Royal Entomological Society.'

Robin Trewinnard-Boyle I would have voted for you! I remember the advice at uni about which professional society to get Chartered by was: Go with the one with the most interesting magazine!" I have no regrets about being Chartered by the RAeS.

Dave Homewood Great! Losing out to the entomology people must 'bug' you though!

The 'baby bus' to JFK

Response to 'On this day in history, on 29 September 2009, British Airways inaugurated its Club World London City A318 service from London City to New York's JFK.'

Hugh Morton I took the 'baby bus' as it was affectionately known a few times. The short stopover in Shannon was a convenient and pleasant way to clear US immigration – you were out the door at JFK in about 20-30 minutes after landing. Shame it did not survive the economics and pandemic.

John Horton I believe the idea was that business people would go for it, because LCY is so much closer to the 'City' than LHR or LGW, but how much time did it really save?

Charles Kennedy Loads. Pre-Elizabeth Line, the City was over an hour or maybe two to Heathrow, regardless of the method of transportation.

Justin Shasha There was also no 'faffing' in the stack on the direct inbound to London and you could be out and into your limo within 29 mins on landing if you had only hand baggage.

Mental health lessons

Response to 'The RAeS Mental Health in Aerospace Awareness event was a resounding success.'

Andrew Morley My key takeaways from this excellently presented and insightful event were:

Measuring the correct data. Missing red flags in a remote workforce.

Evidence suggests many pilots reluctant to come forward due to contract/career concerns.

The NHS Nightingale project as a template for workforce mental health.

The view of the regulators present is to utilise existing SMS/TEM and employment legislation to manage mental health.

The Clark-Layard study provides cost/benefit data for CEOs.

RAeS advocating a British Standard for mental health.

Sobering statistics. Pilots with moderate mental health symptoms 47% more likely to make a mistake. Extrapolated data suggests sadly two pilots a week worldwide take their own lives.

A Pilot's Story

Response to 'A 'Pilot's pilot', RAF fighter pilot, airline captain and author of one of the greatest books about flying – *F-4 Phantom - A Pilot's Story*, Robert Prest is one of our heroes for #BlackHistoryMonth.'[2]

@Icarus1054 One of the first aviation books I read as a teenager – a true classic.

NHS drone scale-up

Response to 'UK government announces £4m in future flight projects, including scaling up deliveries of urgent medical samples by drone from 1,000 to 50,000 per month.'

@Geordie_Brigand In conjunction with that, it would be a good idea to set up a Drone Recovery Service. There are bound to be the usual bird strikes, random incidents, etc. Also, I guess potential hazardous materials incidents.

Introducing Europa

Response to 'Introducing CA-1 Europa, Tom Enders says Helsing "has the potential to become a 21st Century Airbus".'

@SatwaSir Looks very much like the MQ-28 Ghost Bat. Imitation is the highest form of flattery I suppose?

@gregbagwell Being subsonic, having a small payload (that bay does not look very big) and attritable means it may not have a high enough success rate to make the low-cost pay-off.

@StijnOerde Designed in 14 weeks is not necessarily a selling point. Especially for an inexperienced company.

@DeMorcerf ITAR free? I have doubts.

New (look) millennium

Response to 'Cool new paint scheme for Embraer's Millennium demonstrator – rapidly racking up sales as the 21st Century airlifter.'[3]

@scottiebateman It is surprising that it is doing so well, especially as it is a largely unproven platform.

@JonA2i The C-390 has a payload bay of 60.6ft × 9.8ft x11.3ft, up to 57,320lb of payload, cruising at Mach 0.8. Compared to a C-130J's 41ft x 10ft x 9ft, 42,000lb and Mach 0.59, which would you buy?

@TreFab1 The sales are not incredible. Total orders 38 with ten options and another 13 in negotiation? Order backlog of 28 and a production rhythm of three per year max?

Dead on arrival?

Response to 'Amid questions over the future of the Franco-German-Spanish future fighter programme, is SCAF dead on arrival?'[4]

@paul_tremelling Excellent article. Both SCAF and GCAP are first and foremost about keeping national champion primes' lines warm. Why bother if they are hot? Of course you can construct a capability argument... if you really try.

@ChrisWidnes1975 It was plain as day at the 2018 International Fighter Conference in Berlin that this was dead.

Rearming at pace

Response to 'Scaling up production of drones and counter-drone interceptors a key theme of DSEI.'[5]

@MisterQuintus The drone is the end of the line, we need indigenous component production capacity first, especially brushless motors and batteries.

Putting workers in charge of aviation's green flight path

Aviation workers need a say in the direction of flight of our industry. After all, it is workers who will face the consequences of whether or not our industry decarbonises in time to slow climate breakdown or to avoid panicked climate legislation in years to come.

We can give workers more agency through Workers' Assemblies. They bring together a representative group of workers chosen through sortition (a form of lottery) who hear from experts on a topic, deliberate and then make decisions to guide government or trade union policy.

I work with Safe Landing, a community of aviation workers who are passionate about aviation and protecting the natural world. We've held two assemblies, most recently a 'Visioning Assembly' in 2025 to co-create a positive, worker-led vision for the future of aviation. We wanted to create a vision of what aviation will look like in 2050 if our industry gets this right, something exciting to inspire and guide aviation workers.

Twenty-six workers from across the industry were selected to represent a diversity of job roles, gender, ethnicity, age and views on climate change. There is fair representation in decision-making, through mechanisms, like citizens' assemblies to enable long-term planning and investment.

Participants co-created a vision for the future of aviation covering five key aspects: social responsibility, financial, technical, political and environmental.

The assembly proved that when workers are given a collective voice, we can plan for the long-term, making decisions that protect both our jobs and the planet, preserving the industry for generations to come.

Aviation workers have a wealth of experience and knowledge to bring to the table. We also have so much to gain by giving workers a voice and having tough conversations about the future of the industry we love.

To find out more about the Visioning Assembly and join the Safe Landing community head to our website safe-landing.org.

George Hibberd

(1) aerosociety.com/news/recruiting-a-next-generation-air-force-will-gen-z-fight-in-ww3/
(2) aerosociety.com/news/black-history-month-five-notable-black-aviation-heroes/
(3) youtube.com/watch?v=-G3G4bJad_4
(4) aerosociety.com/news/scaf-dead-on-arrival/
(5) aerosociety.com/news/rearming-at-pace-dsei-2025/

Crown Copyright

The **Sir Maurice Flanagan** archives:

A giant aviation legacy

As Dubai-based Emirates celebrates its 40th anniversary, **GEORGINA TOWNSEND** from the National Aerospace Library delves into the diaries of its founder, Sir Maurice Flanagan to relive the birth of the region's largest airline.

As Emirates celebrates its 40th anniversary, the airline reflects on its remarkable journey from a carrier with modest beginnings to a global aviation giant.

At the heart of this success story is the late Sir Maurice Flanagan KBE HonFRAeS, a pioneering leader whose strategic vision, business acumen and dedication to excellence were instrumental in building and transforming Emirates into one of today's most successful and best-known global airlines.

Honouring his remarkable contributions to the industry, the National Aerospace Library (NAL) recently received a significant donation from his family in the form of his personal and professional papers. This collection offers a window into the life of the man who shaped Emirates as well as played a pivotal role in advancing the broader aviation landscape. From documents, photographs and media recordings to creative works, the collection provides a valuable insight into the life and career of Sir Maurice Flanagan for researchers, historians and enthusiasts.

NAL/RAeS

▲ Sir Maurice Flanagan addresses the RAeS in 1986.

Founding an airline

In 1973, British Overseas Airways Corporation (BOAC) sold its investment in Gulf Aviation to the governments of Bahrain, Abu Dhabi, Oman and Qatar, each taking a 25% share in what became Gulf Air. As the flag carrier for the region, Gulf Air served the UAE, but its decision to reduce and withdraw services from Dubai in the early 1980s presented both a unique challenge and an opportunity for the Emirate.

Sheikh Mohammed bin Rashid Al Maktoum, current UAE Prime Minister and Ruler of Dubai, was ambitious for Dubai to become an international tourist destination and commercial hub of the Middle East. With its geographical location straddling both East and West making it ideal for international passenger connections, the vision for Dubai's own airline was realised.

Maurice Flanagan, then Managing Director of Dubai National Air Travel Agency (DNATA) was tasked with making this vision a reality. Despite Flanagan being a 25 year veteran of BOAC and British Airways, this presented a formidable challenge: the airline held no aircraft of its own, needed to be launched in five months and had a limited budget of $10m. Sheikh Mohammed bin Rashid Al Maktoum told Flanagan 'there was to be no protectionism, that Dubai would continue its Open Skies policy and there would be no subsidies.'

With no aircraft of its own, the new carrier entered a one-year management and support contract with Pakistan International Airlines (PIA) for the lease of an Airbus Industrie A300B4 and a Boeing 737. The UAE Royal Family's Dubai Air Wing also provided two Boeing 727s which would initially be used on daily services between Dubai and Karachi, Pakistan before expanding to other Middle-Eastern countries such as Jordan and Egypt.

Into service

On 25 October 1985 services began to Bombay, New Delhi and Karachi – Emirates was operational. The spring of 1986 saw services begin to expand with the initiation of routes to Cairo, Colombo and Dhaka and the airline ordering its first purchased aircraft, two A310s.

Emirates' first full year of service saw 287,762 passengers flown with revenues totalling $63.1m. With costs held down, there was an operating profit of $3.26m. This success was seen to continue as Emirates rapidly expanded its network, adding destinations across the Middle East, Asia and Europe. Within just a decade, the airline was recognised as a serious contender in the global aviation market – Flanagan had successfully, despite fierce competition from established carriers, launched Emirates.

> THE AIRLINE HELD NO AIRCRAFT OF ITS OWN, NEEDED TO BE LAUNCHED IN FIVE MONTHS AND HAD A LIMITED BUDGET OF $10M

NAL/RAeS

▲ Sir Donald Spiers (Right, RAeS President 1995-96) shaking hands with Sir Maurice Flanagan.

Leading light

Sir Maurice Flanagan KBE HonFRAeS was a miner's son from Lancashire who had originally aspired to play football for Blackburn Rovers until an injury redirected his path. After graduating from Liverpool University, Flanagan completed his National Service with the RAF as a navigating officer. Within the NAL's collection of photographs is one of Flanagan with fellow F Flight aviators of 1 Sqn, providing insight into his early exposure to aviation.

He later made his way in the airline industry, joining BOAC as a graduate trainee. He ascended through a variety of overseas posts and returned to the UK in 1965 as a route planning manager, joining British Airways' senior management team in 1974.

In 1978, Flanagan left British Airways to work in Dubai for both Dubai International Airport and travel operator, DNATA, the latter being the sole ground handling agent at the airport. In Dubai he formed a remarkable partnership with the ruling family, including current ruler, Sheikh Mohammed and Sheikh Ahmed bin Saeed Al Maktoum, the current chairman of the Emirates airline.

Strategic location

Due to Dubai's geographical location, there were few major markets that Emirates could not reach within a single eight-hour flight. This natural

Ken Fielding/WikiCommons

▲ Having been gifted a pair of Boeing 727s by the Dubai Air Wing, Emirates went on to acquire a third example, A6-EMC, seen here in 1991.

advantage, alongside the lack of corporate tax and ability to keep other fixed costs low, were natural advantages that saw Emirates strive from success to success against its rivals.

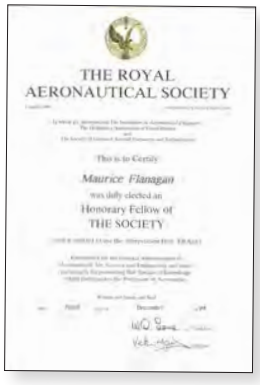
Flanagan had approached the launch of Emirates with a bold expansion strategy for aggressive growth which, paired with the lean management structure of this newly-born airline, allowed decisions to be discussed and quickly executed, all which benefited the continual expansion of Emirates. His relentless pursuit of operational excellence, paired with his ability to anticipate market trends and adapt Emirates' strategy accordingly, were instrumental for rapid growth and transforming Emirates into one of the world's leading airlines.

Flanagan's papers, now housed at the NAL, provide insight into some of these strategic decisions through items, such as his notebook from during the launch of Emirates. These notes present the decisions, processes and analytical approach he took during this time to get the airline up and running, offering researchers and enthusiasts a glimpse into the formative years of Emirates airline.

Built on reputation

Under his leadership and relentless pursuit of excellence, Emirates became synonymous with luxury and innovation. The airline was one of the first to introduce in-flight entertainment systems, redefining the passenger experience on long-haul flights. It also pioneered the development of lie-flat seats in business class and spacious cabins that set a new standard for comfort.
By the early 2000s, Emirates was regularly winning international awards for its service excellence and operational efficiency. The airline's continued growth also played a significant role in transforming Dubai into a major global aviation and tourism hub with Dubai International Airport, home to Emirates' operations, becoming one of the busiest airports in the world.

▼ Sir Maurice Flanagan was awarded the title of RAeS Honorary Fellow in 1998.


THE ROYAL
AERONAUTICAL SOCIETY

This is to Certify
Maurice Flanagan
was duly elected an
Honorary Fellow of
THE SOCIETY

This growth also branched into education, with the creation of the Emirates Aviation University, which today is the Middle East's leading institution for aeronautical engineering, aviation management, business management and aviation safety and security studies. The success of the Dubai Airshow, now one of the world's biggest airshows, known for its landmark deals and multi-billion-dollar orders further cements Emirates' success in making Dubai an aviation hub.

As Emirates expanded its fleet and network, Flanagan's role remained critical in navigating challenges of a highly competitive industry. However, his leadership extended far beyond operational matters and he was also deeply involved in shaping Emirates' public image.

He played a central role in high-profile marketing campaigns and sponsorships, which helped establish the airline as a premium brand. In 2004 Emirates signed a £100m deal with English Premiership football club, Arsenal, including naming rights to its new stadium for 15 years and shirt sponsorship for eight years starting from the 2006/2007 season. This was renewed in 2012 and 2018, making it the longest running shirt partnership in the Premier League and one of the longest relationships in world sport.

Emirates' breadth of sponsorship continues to grow as they sponsor various sports teams and events from football and tennis to motorsports and horse racing, while also connecting communities through music, film and literature by sponsoring international symphonies, festivals and performances.

Flanagan's dynamic leadership and public presence that made these campaigns promised for success are captured in the NAL's collection of VHS recordings, alongside papers presenting his

▲ Emirates ordered 65 Airbus A350-900s, with the first arriving in November 2024.

◥ Maurice Flanagan seen, fourth from the left on the front row, during his National Service in 1950.

interviews, lectures and speeches. Flanagan set the foundations for Emirates' global presence that would only continue to grow. Notably within the collection is his talk for the 1996 RAeS Sopwith Lecture and his speech to the Wings Club in 2004.

Recognition

Flanagan's contributions within the industry did not go unrecognised and he was presented with various awards and honours. In 2010 he was appointed Knight Commander of the Order of the British Empire which was bestowed upon him in a special ceremony when Queen Elizabeth II visited the UAE. He also received honours from the Chartered Institute of Transport Fellowship, the Guild of Air Pilots and Air Navigators and an Honorary Fellowship to the RAeS, all of which are now accessible within the NAL's collection.

However, this collection also goes beyond his professional career and achievements in aviation and reflects Flanagan's personal life. A leading patron of Dubai's Emirates Festival of Literature, he had his own personal literary pursuits with a published poetry book, *Lines of Descent* co-authored with his son, Julian. He was also the writer of an award-winning TV play, *The Garbler Strategy*, which was a satire on management theory and not only won the playwriting competition ran by *The Observer* newspaper and ITV's *Saturday Night Theatre* in 1969 but also gained Flanagan attention from Kenneth Tynan, a theatre critic and writer who invited him to write for the National Theatre where he was a literary adviser.

▶ Emirates opens UAE's aviation spectacular at the Dubai Airshow 2023 with a stunning aerial formation.

▼ Sir Maurice Flanagan was integral to many of the high-profile marketing campaigns and sponsorships, which helped establish the airline as a premium brand.

Emirates 2025

As it marks its 40th anniversary, Emirates is the world's third-largest airline by scheduled revenue passenger-kilometres flown and the second-largest in terms of freight tonne-kilometres flown. At the time of writing it boasts a fleet of 246 airliners with a further 22 on order and remains the world's largest operator of the Airbus A380. The airline was an early supporter of Airbus' plans to build the A380 and ultimately received 123 examples of the 'super jumbo' – including the last ever built – with 96 remaining in service today.

Making up the bulk of its operational fleet in 2025 are 140 Boeing 777s and the carrier has a further 12 on order – again making it the largest operator of the type. In 2014, Emirates retired the first of its first-generation of 777s after 18 years of service, and in October of that year took delivery of its 100th Boeing 777-300ER. At the 2023 Dubai Airshow, Emirates placed an order for an additional 35 777-8s and 55 777-9s, with the first delivery now expected in late 2026 or early 2027.

At the same airshow, the airline placed an order for an additional 15 A350-900s, adding to the 50 ordered in 2019. The first was delivered in November 2024 – the first time a new aircraft type had entered the fleet since the A380 in 2008. At the time of writing it had received 19 examples. Completing the fleet is a single Airbus ACJ319 corporate jet fitted out with a VIP interior complete with ten suites.

As of late 2025, Emirates flies to over 140 destinations across six continents and, in this anniversary year, it expanded its global network with new direct flights to Shenzhen (China) and new services to Da Nang (Vietnam) and Siem Reap (Cambodia) via Bangkok.

As part of its multi-billion dollar initiative to refurbish 219 aircraft, the airline has already completed nose to tail upgrades on 67 aircraft. The airline is on track to offer nearly 2m Premium Economy seats annually across its network by the end of 2025, doubling to 4m by 2026.

This investment helped Emirates become the world's most profitable airline in 2024 with pre-tax profits to the 12-month period ending 31 March 2025 sitting at £4.3bn – its highest ever and a 20% increase year-on-year.

Emirates

> THIS COLLECTION OFFERS A WINDOW INTO THE LIFE OF THE MAN WHO NOT ONLY SHAPED EMIRATES' TRAJECTORY BUT ALSO PLAYED A PIVOTAL ROLE IN ADVANCING THE BROADER AVIATION LANDSCAPE

Deciding against this, Flanagan's career within aviation spanned more than 60 years, during which he led Emirates towards global success. The impact he had within Emirates was seen upon his retirement in 2013, where he was gifted a heartfelt thank-you card from Emirates staff, a poignant reminder of the profound respect and admiration he had earned within the organisation. This admiration and respect were further seen after his passing in 2015, with Sheikh Ahmed Bin Saeed Al Maktoum, President of Dubai Civil Aviation and Chairman and CEO of Emirates speaking to *Gulf News* saying "Maurice was a man of great character and a legend in the aviation industry...His contributions to DNATA, Emirates and Dubai will always be remembered."

Saved for posterity

With 2025 marking the 40th anniversary of Emirates, the donation of Sir Maurice Flanagan's personal and professional papers to the NAL stands as a tribute to the man whose vision and leadership shaped one of the world's most iconic airlines.

These materials provide a rich portrait of Sir Maurice Flanagan, capturing both his monumental contribution to the aviation industry and his personal passions. The NAL's preservation of this collection not only honours his legacy but also underscores the enduring importance of documenting and celebrating the history of aviation to continue to inspire future generations of aviation professionals, historians and enthusiasts.

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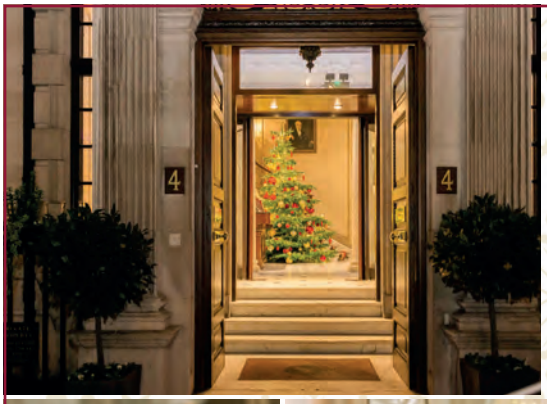

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Building a resilient global aviation workforce

With aviation skills now top of the international agenda, RAeS Head of External Affairs, **JONATHAN CLARE** reports from the 42nd ICAO Assembly in Montreal.

A clear message resonated across the International Civil Aviation Organization (ICAO) forums in September: the future sustainability, safety and growth of aviation depend on building and maintaining a resilient workforce.

At the 42nd ICAO Assembly in Montreal, two critical initiatives, the Next Generation of Aviation Professionals (NGAP) Programme and the Global Aviation and Aerospace Skills Taskforce (GAAST), were brought into sharper focus, underlining the sector's determination to confront systemic workforce challenges through international collaboration and forward-looking initiatives.

ICAO forecasts estimate that the global system will require more than 2.5m new aviation personnel by 2043 to maintain safe and efficient operations. Yet, workforce shortages are already impacting operations across the sector. From air traffic management to ground handling, maintenance, cyber-security and airport operations, staffing pressures are evident and intensifying.

▶ The author with ICAO General Secretary, Juan Carlos Salazar, during the 42nd ICAO Assembly in Montreal.

Next generation of aviation professionals

The *NGAP Working Paper* highlights that this shortage is not just a human resources issue but has direct risk implications for safety, oversight and resilience. "The aviation workforce is a pillar of system safety and resilience," noted an ICAO senior representative at the conference, adding: "addressing workforce shortages is not optional but essential to the sustainability of global aviation."

Originally designed to engage with young people entering the profession, ICAO's NGAP Programme has now been revitalised with a much broader scope. The intention is to not only encompass young professionals but also mid-career entrants, technical staff and individuals transitioning across careers. This latest approach recognises that solutions need to address the full range of aviation roles, namely maintenance engineers, cargo handlers, digital specialists, safety inspectors and airport staff.

> "EUROPE IS CURRENTLY FACING THE RETIREMENT OF 44% OF ITS AEROSPACE WORKFORCE BY 2030

Global aviation and aerospace skills taskforce

Complementing NGAP, GAAST was established to tackle workforce issues at scale, bringing together over 100 states, organisations and industry partners. With the support of the RAeS and other organisations and member states from the UK, Brazil, France, Japan, South Africa and the UAE, GAAST's mandate at the assembly will be to identify skills gaps, share best practices and create the basis of a global repository of solutions to support recruitment, retention and skills development.

The *GAAST Information Paper* notes some stark realities, most notably that the pandemic reduced the aviation workforce by 43% worldwide. Furthermore, Europe is currently facing the retirement of 44% of its aerospace workforce by 2030 and demand for software engineers,

All via Jonathan Clare/RAeS

systems architects and maintenance technicians will surge over the next two decades. GAAST aims to empower states and organisations to implement practical solutions. State representatives noted that "no state or industry actor can solve these challenges in isolation. GAAST is the collaborative bridge needed now."

Both NGAP and GAAST emphasise that the workforce challenge is not merely about numbers; it is also about perception, retention and workplace culture. Aviation still suffers from misperceptions as environmentally harmful and unattractive as a career, compared to technology sectors. The percentage of global emissions from the aerospace sector for 2025 is projected to be around 2.5-3% of global carbon emissions, an increase from previous years due to the rebound in international travel. Meanwhile, high training costs, limited awareness of career pathways and the loss of experienced personnel to other industries have compounded the problem.

GAAST's five workstreams (Value Proposition, Attraction and Outreach, Retention and Development, Workplace Environment and Culture, and Evolution of Work) address these concerns holistically. ICAO's strategic plan for 2026-2050 states clearly its priority in "advancing diversity and attracting top talent to ensure a resilient aviation workforce."

▲ The Royal Aeronautical Society has official observer status at ICAO.

▼ Casey Ferriter, Programme Manager of the Global Aviation and Aerospace Skills Taskforce with the author. The RAeS gave its full support to the GAAST paper presented at the assembly.

The Royal Aeronautical Society gave its full support to both NGAP and GAAST papers presented at the assembly, underlining the Society's long-standing role in advancing professional standards, education and collaboration across the global aerospace community. The RAeS and its partners are advocating for states, educational institutions and industry to actively support the ICAO NGAP resolution, contribute to GAAST's repository and align development with ICAO's strategic goals at scale.

The assembly papers also call on states and stakeholders to strengthen collaboration, including resource and data sharing, offering technical expertise and voluntary financial or in-kind contributions. All these efforts will be vital if the sector is to meet both immediate staffing needs and long-term sustainability challenges.

In summary, the deliberations at ICAO's 42nd Assembly reaffirmed that the future of global aviation rests on a sustainable, diverse and skilled workforce. As one ICAO representative noted, "the future of aviation cannot be secured by technology alone. It will be secured by people and a skilled workforce that powers the industry." The RAeS remains fully committed to supporting collaborative initiatives at the assembly that will ensure that aviation remains safe, sustainable and resilient in the decades ahead.

Every second counts

In the Formula 1-style pit stop that is the turnaround of today's airliners at airport gates, how do you squeeze more efficiency, as well as boosting safety and sustainability? The answer may be AI. **TIM ROBINSON** FRAeS reports.

Watch any airliner arrive at an airport gate these days, and the words that comes to mind are 'tightly choreographed' – with catering, fuel, baggage trucks and passenger bridges all swinging into action to unload the aircraft as swiftly as possible and prepare it for the next flight. These turnaround tasks are well-rehearsed – time is money and on the ground the aircraft is not generating cash. For low-cost airlines, in particular, their business model depends on squeezing as much utilisation out of an airframe as possible – and the goal is turnarounds of 35-45 minutes.

For standard rotation, each turnaround involves up to 300 tasks for a large widebody and up to 75 people moving and perhaps ten vehicles (some now autonomous) in this complex ballet to disgorge passengers and luggage, restock food, empty toilets and waste, clean the cabin and, potentially, refuel and de-ice it.

Yet, as many regular passengers are aware, delays in pushback, missing catering trucks and changed gates can easily cause chaos to this carefully oiled machine. With airline operations now tightly scheduled, any small delays or disruption can ripple through the rest of the system, causing hold-ups and taking precious time to smooth out.

Post-Covid, the airport and aviation industry has also seen a reduction in some areas of expertise among ground staff with new recruits joining more experienced workers – which, in turn, increases the potential risk on the apron and opportunities for issues to arise.

◀ Heathrow Airport is one of 24 airports worldwide using ApronAI to optimise turnarounds.

▼ ApronAI suite allows airport and airlines to observe and track activity at gates – with timestamped video of events.

All Assaia

Finally, this is not just about airline efficiency and 'sweating the assets' but also sustainability. Aircraft with APUs running too early awaiting pushback or idling engines waiting for a stand to become vacant not only waste fuel but add to unnecessary CO_2 emissions at airports.

Unlocking the 'black box' of turnarounds

Yet until now this process, though highly co-ordinated and involving many people, has been somewhat opaque to airliners and airports – where identifying the root causes of delays, bottlenecks and issues has been challenging. Like the proverbial blind men describing different parts of the elephant, getting a holistic view of what is happening (particularly from the different stakeholders involved) can be challenging – and gives rise to questions about assigning responsibility, blame or transparency when things go wrong. Says Sarah Owen, Vice President, Sales, Assaia: "Up until today, it has more or less been a black box, insofar as it's always a post-mortem and a retrospective analysis."

That is until Assaia come on the scene. First founded in 2018, this Swiss AI start-up grew out of an automatic image recognition system designed to detect fault anomalies on a production line, when its potential to solve problems at airports was spotted. With the AI trained to recognise aircraft, vehicles, people, baggage, doors and the multiple tasks that comprise an apron turnaround, once connected to cameras, the system can now monitor, track and alert airports and airlines to any potential bottlenecks from real-time video streams.

Tactical and strategic insights

Fast forward to 2025 and Assaia's ApronAI suite has now been rolled out to more than 24 airports worldwide, including Singapore, London Heathrow, Seattle and Munich, connecting 458 airlines.

The system connects cameras at a gate or stand to provide a time-stamped video of activity, with computer vision detecting and recording each event in the different categories – such as boarding, cleaning, baggage, jet bridge, ground power connections and pushback – which is then integrated into a GUI dashboard, allowing operators to monitor several at once or drill down into specific gates to see exactly where each task is on the expected timeline. Should any of these be delayed, an alert (colour-coded for severity) can be issued via smartphones to airport or airliner managers to allow issues to be resolved.

As well as this tactical operational management of gates (including gate conflict alerts) via a video dashboard that can also pull data sources in from the airports and airlines own systems (such as Airport Operational Database, Airport Management System, Passenger Service System), the data collected

(1.8+ million turnarounds) can also be used to identify recurring issues, predict bottlenecks and help in airport planning and expansion – giving a high level strategic overview of airport apron operations. Says Owen: "In time, you start to build up a very holistic vision of what is actually going on at your airport. Where are the bottlenecks in my operation?"

If the cameras are thermal, (or acoustic sensors are used) Assaia also offers Emissions Control, to detect and limit excess APU activity beyond what is necessary using thermal cameras – allowing for a reduction in CO_2, and ensuring compliance with local regulations, as well as reducing noise pollution.

So far, the results have been impressive from users – with Seattle Airport reporting a 79% drop in gate holding time, JFK's T4 reporting a 25% increase in gates clear on arrival, while Canada's Toronto Pearson saw a 44% reduction in taxi-in time.

Airlines too, such as Alaska and United, are also reporting between 2-4 minute average reduction in ground delays when using gates utilising ApronAI. These may not seem like much but, if multiplied over every flight per year, these equate to multi-million-dollar savings for airports and airlines.

The next step will see Assaia integrate a LLM (Large Language Model) TurnGPT, into its ApronAI system, allowing users to query the dataset in natural language, discover historical trends and create on-time and performance graphs.

Summary

In the past, much attention (rightly) has been given to visibility of airliners in the air, and the introduction of ADS-B has now allowed airport ground vehicles to be equipped with this technology – bringing new visibility to airport operations. However, AI and computerised vision now brings even more granularity and transparency to optimising and understanding how to get aircraft back in the air as quickly, safely and sustainably as possible. Says Owen: "It removes that ambiguity and gives you a single source of absolute objective fact to make decisions more effectively and quicker."

Countdown to Gulf air taxis

As Archer and Joby prepare to roll out eVTOL air taxi services in the UAE in 2026, **GRAHAM GREIG** looks at the final steps for advanced air mobility in the Gulf.

Fortune favours the bold, as the old saying has it, and the Middle East's aerospace powerhouse, the UAE, seems determined to steal a march on the world in the new field of Advanced Air Mobility (AAM).

The rush to create a viable eVTOL 'flying taxi' aircraft has seen dozens of companies propose designs, only for the vast majority to fall by the wayside. In many cases, the 'Valley of Death' – that period of creating or scaling up production facilities, when investing in hardware and new personnel sees expenses rocketing before sales revenues start to flow – has proved fatal.

However, two US companies – Archer Aviation and Joby Aviation – are now on the verge of starting the world's first operational eVTOL services, and both aim to start flights in 2026.

UAE takes a chance on eVTOLs

Finding locations around the world where the eVTOLs can actually operate commercially has been difficult. There is a problem operating in London, for example, because there are no suitable locations in the city centre for vertiports, as AAM bases have been dubbed.

The UAE – specifically, the Emirates of Dubai and Abu Dhabi – has seen an opening in the marketplace and has decided to become the test bed for these new-generation ultra short-range urban aerial journeys. This is significantly simpler to achieve in the UAE, with its top-down form of government, than it is in the West. Additionally, both Emirates have long seen aviation as a major plank in their economies and have established the conditions to bring innovative aerospace developments on-line much faster than in many other countries.

In Abu Dhabi, Archer will initially operate its Midnight aircraft between the existing Al Bateen Executive Airport, Abu Dhabi Cruise Terminal and Yas Island. In neighbouring Dubai, the initial vertiports will be located just outside Dubai International Airport, adjacent to Emirates airline's HQ, Dubai Marina, the Palm Jumeirah and downtown Dubai.

The aim in both Emirates is to cut what are often 60-75-minute road journeys on the UAE's increasingly clogged motorways down to 15-20-minute hops in the respective companies' electrically powered aircraft. Joby has recently announced plans to extend its services in 2027 to a series of vertiports in Ras Al Khaimah, the most northerly of the seven Emirates that make up the United Arab Emirates.

Midnight is a piloted, four-passenger aircraft designed to perform rapid back-to-back flights with minimal charge time between flights

Archer Aviation

Withstanding the heat

Joby conducted a series of around 20 demonstration flights in Dubai over June and July, demonstrating transitions between vertical and horizontal flight, the company's UAE General Manager, Anthony Khoury said. He continued: "For commercial operations, we expect to start sometime in 2026. We don't have a formalised date because, as you can appreciate, there are a lot of stakeholders – the [regulator] GCAA, the Road Traffic Authority etc... We've had extensive discussions with the regulators. We [originally] wanted to get it as early as 2025. The reality of a novel technology means that it just takes time to get everyone aligned with it."

According to Khoury, the demonstration flights so far have been designed to "show the aircraft's maturity in terms of technology and doing well in the Dubai environment" – the extreme temperatures and, consequently, thinner air of the UAE's lengthy summer have a material effect on the performance of any aircraft. Emirates airline's President, Sir Tim Clark is on record as saying that, while he was interested in Joby's project, much would depend on how it stood up to Dubai's torrid weather.

Almost every modern aircraft entering commercial service seeks initial certification from either the US FAA or the EU's EASA. Unusually, Joby and Archer are first aiming for certification from the UAE regulator, with the US and European organisations following later.

"We will have our own AOC in Dubai," said Khoury. "The GCAA, as a sovereign authority, has the ability to certify aircraft for operation in its skies. They have defined a path for 'qualification', as they call it.

"They have been reviewing extensively the data we've been accumulating from years of testing and demonstrations. They've created a taskforce that often comes to the US to sit down with our engineers. They have several milestones that we need to hit, then we get A6 registration [the UAE's national registration mark]."

Joby's progress so far

Joby's certified aircraft will have a range of 160km and a maximum speed of 320km/h, with a target payload of 450kg. It will be able to carry a pilot and four passengers.

Who does Khoury see as being first users of the new aircraft? "I think our early passengers will be defined by a couple of factors. One will be the infrastructure where we're located and by the number of aircraft."

Bearing in mind the four initial locations in Dubai, he believed that business travellers "will definitely be part of the early adopters." Tourists eager to try a new mode of transport will also feature among the first users. The larger local population will probably start to use the aircraft later, when a broader network of vertiports has been built up. Joby will start operations with two aircraft, with a further two arriving quickly thereafter.

The company has a six-year exclusivity agreement with the Dubai authorities. Meanwhile, Archer has gained the support of the Abu Dhabi authorities to support the start of operations as soon as possible.

Joby has recently announced its plans for its first services outside Dubai, namely flights to and within Ras Al Khaimah, with Khoury also considering services for Sharjah, which abuts Dubai, and which also suffers from heavy traffic on the road linking them.

"But my ambition is really to be in more locations in Dubai, such as the Mall of the Emirates and Dubai's islands," Khoury said.

Construction of the Dubai International Airport vertiport started in January this year and should have been topped out by the time this issue of *AEROSPACE* appears. The site should be completed towards the end of Q1 2026, with flights starting in Q2, according to Damian Kysely, Head of Infrastructure, Europe and Middle East, for Skyports, the construction company handling the project. There will be a period of testing before full-scale operations get under way.

The Dubai Marina site will be next; construction started later than the airport site but is expected to proceed more swiftly, using the experience gained on the initial location to speed things up. The following two Dubai sites are planned for completion in December next year, and there will be a gradual expansion of the network thereafter, with Ras Al Khaimah following in early 2027.

Each vertiport will typically have either a single or double landing area: "We don't build separate maintenance areas; we anticipate one landing area can be used for light maintenance," Kysely said. In facilities where there is only one pad, a small extension to the landing deck will be constructed for this purpose. All the vertiports will be capable of recharging all eVTOLs currently on the market. Additionally, they will be able to handle 'hybrid' operations – serving both eVTOLs and conventional helicopters.

Joby Aviation

▲ Joby's certified aircraft will have a range of 160km and a maximum speed of 320km/h, with a target payload of 450kg. It will be able to carry a pilot and four passengers.

Lifting Archer off the ground

In Abu Dhabi, meanwhile, Archer Aviation is making similarly rapid progress towards first commercial flights. Last year, the company signed a framework agreement with the local authorities, said to be worth several hundred million dollars to accelerate its work in the Emirate.

Like Joby, Archer is co-ordinating with government partners to develop the necessary vertiports and charging infrastructure.

Key components of Archer's collaboration with the Abu Dhabi Investment Office (ADIO) include vertiport construction, operational enablement for air taxi operations in the UAE and in-country manufacturing of Archer's Midnight aircraft. Midnight is a piloted, four-passenger aircraft designed to perform rapid back-to-back flights with minimal charge time between flights. Under the agreement, ADIO will also ensure local workforce development programmes for Emirati personnel and facilitate the establishment of Archer's international headquarters and a centre of excellence in Abu Dhabi.

"This substantial agreement with Abu Dhabi is a pivotal moment for Archer's commercialisation efforts across the emirates, as it provides the catalyst to accelerate the launch of our electric air taxi service in the UAE as soon as late 2025," Archer Aviation's Founder and CEO, Adam Goldstein, said at the time. That target now seems unlikely to be met.

"The agreement underscores Abu Dhabi's strong commitment to Archer and conviction to become a global hub for urban air mobility. With Abu Dhabi's support, we are poised to continue leading the transformation of urban transportation in the emirate and across the globe.

"Our target audience includes anyone who wants to avoid long, traffic-heavy journeys by taking shorter, more sustainable trips through the sky. In the near term, we'll focus on readying infrastructure, bringing more Midnight aircraft to the region and conducting early passenger flights as we work toward full-scale commercial operations authorised by the GCAA."

This qualification procedure "presents an opportunity for Archer to collect data and build the operational expertise that will support its commercial and certification efforts, not only in the US but also around the world," continued Goldstein.

ADIO's Director General, Badr Al-Olama added: "Abu Dhabi is leading the way in accelerating the launch of electric air taxis globally, and ADIO is proud to partner with Archer as one of the world's most innovative companies." That process will see Archer gradually expanding its operations to regions of the UAE outside Abu Dhabi and then to neighbouring countries.

ADIO and Archer first announced an MoU at the 2023 launch of ADIO's Smart and Autonomous Vehicles Industry (SAVI) cluster, which aims to transform the future of urban mobility globally by supporting the innovation and commercialisation of smart and autonomous vehicles across land, sea and air. The framework agreement with Archer followed six months of close collaboration between the two entities.

Importantly, ADIO and Archer will continue to work with the support of its early investor and UAE's sovereign wealth fund, Mubadala, and the company's partner operators, Falcon Aviation and Air Chateau. GAL-AMMROC has also announced plans to provide maintenance, repair and overhaul (MRO) support for Archer's eVTOL aircraft. Archer plans to deliver its first Midnight aircraft to the UAE for its planned deployment later this year.

Like Joby, Archer's flight test operations are focused on evaluating the aircraft's vertical take-off and landing performance in UAE-specific conditions, including high temperatures, humidity and dust exposure in advance of commercial deployment – conditions that have proved seriously detrimental to the latest generation of commercial turbofans in airliners.

Earlier this year Archer rolled out its 'Launch Edition' programme, which aims to establish a clear plan to deploy Midnight commercially to early adopter markets. Archer also announced its first two customers: Abu Dhabi Aviation and Ethiopian Airlines.

And in July, a Midnight aircraft flew for the first time at Abu Dhabi's Al Bateen Executive Airport, marking a key milestone for its planned commercial deployment in the UAE and the expansion of its operations in the Middle East region. Following this milestone, Archer will expand its flight-testing programme for Midnight in the region, gathering additional data to support its certification and commercialisation plans in both the UAE and other markets.

The first flight marked "a significant step towards realising Abu Dhabi's ambition to lead the world in advanced urban air mobility," said ADIO's Al-Olama. "Through the Smart and Autonomous Vehicles Industry (SAVI) Cluster, we are enabling companies, like Archer, to test, certify and scale next-generation air mobility solutions, reinforcing our position as a global launch pad for innovation and a hub for transformative technologies."

"Our initial test flight operations in the UAE represent a critical milestone as we prepare for our commercial deployment in Abu Dhabi," said Archer Aviation's Goldstein. "Testing our aircraft in actual operating conditions in the middle of summer provides us with the data we need to progress our commercial and certification efforts both in the UAE and in the US."

Recent achievements have included regulatory design approval for the UAE's first hybrid heliport at Abu Dhabi Cruise Terminal.

> "BOTH EMIRATES HAVE LONG SEEN AVIATION AS A MAJOR PLANK IN THEIR ECONOMIES AND HAVE ESTABLISHED THE CONDITIONS TO BRING INNOVATIVE AEROSPACE DEVELOP-MENTS ON-LINE MUCH FASTER THAN IN MANY OTHER COUNTRIES

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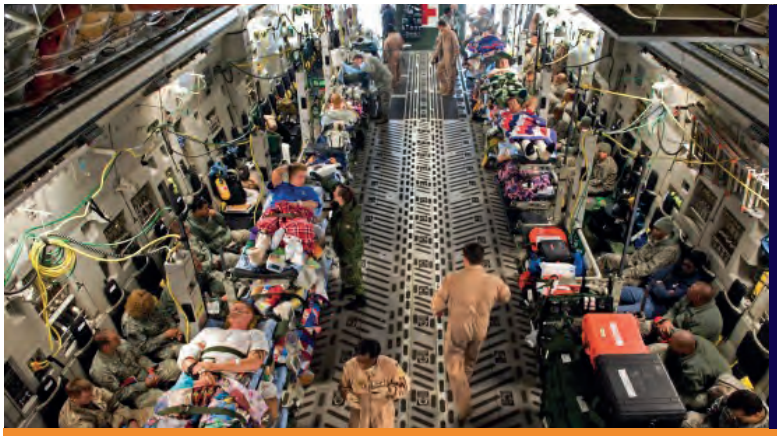

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Attract, recruit, train, retain

With 'People in Aerospace' as its key theme, the 2025 RAeS President's Conference took place on 7-8 October. **STEPHEN BRIDGEWATER** FRAeS provides a snapshot of an insightful few days.

Every year the RAeS President has the privilege of influencing the direction the Society travels and 2025/26 President, Dr Alisdair Wood, focused on two key themes: 'people in aerospace' and 'safety enablers,' explaining in his opening address at the 2025 President's Conference that the two are intimately linked. "People are at the heart of the aerospace sector, driving innovation, ensuring safety and shaping the future of flight," he told a packed auditorium during his opening address. "From engineers and pilots to researchers and policymakers, it is their expertise, creativity and dedication that turns ambitious ideas into reality."

While technology advances and the aerospace industry undergoes rapid transformation, the need for skilled, adaptable and diverse talent becomes ever more vital. "Ultimately, while aerospace is defined by its machines and systems, it is people who design, operate and inspire them," Wood explained, before handing over to IATA's Government Affairs Manager UK & Ireland, Peter O'Broin.

25 by 2025

"How we deal with the evolution of skills over the next 30 years is one of the key issues that IATA is dealing with now," explained O'Broin. IATA forecasts a doubling of passengers globally over the next 20 years and ICAO predicts that by the early 2040s there will be a need for another 2.5m aviation workers. As a case study, he discussed the '25 by 2025' programme which has seen IATA set a growth goal to increase the share of female employees in senior positions in its member airlines to 25%.

While the final figures were still being collated, O'Broin revealed that at the end of 2024 a global average of 40.3% of employees were female, with those in senior positions steadily rising to 31.4%. The proportion working in flight deck roles has also risen year-on-year from 4.6% in 2021 to 6.2% in 2024 and those in tech roles has risen from 19.6% to 23.3%. While the trends are going in the right direction, O'Broin acknowledged that the absolute figures were still very low. "We have the wheels in motion, but we are still in first gear" he analogised, "we need to go up through the gears as we move beyond 2025."

Gender parity and 'squiggly careers'

The first of many fascinating panel discussions held over the two days explored recruitment and gender parity in more detail. Chaired by Head of People and Culture of International Airlines Group (IAG), Adrian Binfield, the panel featured Dr Heidi

◣ RAeS President, Dr Alisdair Wood, chairs the 'Leadership and professional development' panel, quizzing EUROCAE Director General, Anna von Groote, British Airways Speedbird Pilot Academy Project Lead, Guy Bowen, and Air Cdre Robin Caine, Head of Flying Training with the UK Military Flying Training System about paths into industry.

▼ UK Prime Minister, Sir Keir Starmer, meets a group of Airbus apprentices earlier this year. The importance of apprenticeships was emphasised during the conference, which was sponsored by Airbus.

Alex Bielinski/RAeS

No 10 Downing Street

Thiemann (Director and Co-Founder, the Space Skills Alliance), Prof Richard Curran (Professor of Aviation Management at City, University of London) and Bernice Huntley (Future Workforce Lead, UK Space Agency) with Binfield explaining that, while he was "tremendously proud" of IAG's diverse workforce, "we are seeing pretty significant changes in what our workforce is looking for from us as an employer or from the sector in general." He explained that recruits are "looking increasingly for companies with a real purpose and that are committed to creating the right cultural environment whether that is around giving them a sense of inclusion and belonging, investing in their future, giving them increased flexibility or whether it is the position the company takes around social issues." He also referenced "squiggly career people" and explained that "the days when folk join [a company] as graduates or apprentices and stay with the same organisation for 40 plus years are gone. So, we need to look at how we can capitalise on the different experiences gained in very different industries and sectors, bringing that to bear to help drive innovation, creativity and address some of our biggest issues."

Dr Heidi Thiemann of the Space Skills Alliance emphasised the need for role models, citing the uptake in people applying to study physics at Manchester University following Prof Brian Cox's TV shows or when Tim Peake went into space.

The UKSA's Huntley provided a great example of how changing tack is having successes. "Last year, for the first time ever, the UKSA worked with a higher education college rather than a university and created a geospatial course at Fife College that we fully funded so that it was free for anybody to attend," she explained. "There were many successes, but one that we are particularly proud of is the college's cleaner who moved her shifts to 5am so that she could study – and now she is working in the UK space industry!"

During his presentation, IATA's O'Broin referred to the uptake in AI as equivalent to the internet revolution 25 years ago. "This is a revolution that is going to change the ways we do things." However, he went on to show an example of the Gartner Hype Cycle graph, suggesting that the Generative AI landscape has now passed the point of initial peak of optimism, expectation and hype into the trough of disillusionment. "We now know that there are some really exciting opportunities," he explained, "but actually we're probably a few years away from being able to fully utilise AI to the best of its capabilities – both as individuals and as companies."

The human-machine interaction

A separate panel discussion on the human machine interface saw Stuart Evans, Director of Future of Work & Digital Experience at Rolls-Royce and Mike Dwyer, VP-Head of Intelligent Industry UK at Capgemini discuss with the RAeS President the challenges and opportunities ahead. Referring to O'Broin's hype cycle, Evans postulated that "that was decades ago. We are now in the realisation stage of the benefits that could be driven out of AI."

The AI revolution has often been likened to the advent of the internet but Evans suggested this is a much bigger innovation akin to "the discovery of electricity." In terms of statistics, Evans quotes 45% of all employees, globally, with a higher or postgrad education say they use ChatGPT on a day-to-day basis and 76% of the world's offices are accessing AI tools daily. He went on to explain that Rolls-Royce is now using Generative AI "to digitise engineers' knowledge, digitise our corporate knowledge and do things that previously had been impossible." The service data available for one of its aero engines can now be analysed in "seconds" as opposed to the "500 years it would take a human to read it."

Capgemini UK's Mike Dwyer explained how he had been through Rolls Royce's graduate training programme as a young engineer and got to experience all parts of the business and speak to lots of experienced employees – but it took 18 months. "Imagine if you could get your employees job ready

◢ Stuart Evans, Director of Future of Work & Digital Experience at Rolls-Royce explained how AI is changing the workplace, including discussion of BMW's Figure 02 robots, which have been "working ten hours a day, seven days a week" in the X3 factory for the last five months.

▼ Capgemini UK's Mike Dwyer introduced delegates to 'Dr Tara Singh' – an avatar that employees can speak to and ask how best to do a job. Dr Singh allows you to upload staff experience and data and in return provides employees with structured information, videos and testimonials when requested.

◢◢ Apprenticeship or degree? The route into aerospace was discussed at length.

BMW

CapGemini

Airbus

in half the time?" he pondered. "Even with a graduate training scheme that is difficult because there is no structured way of understanding other people's experience in a condensed manner."

Working together

One of the standout panel sessions was titled 'Stronger partnerships for future talent' and brought together The Air League's CEO, Janine Hornsby, the CAA's Head of Customer Experience, Sophie Jones, and the RAeS' own CEO, David Edwards, to talk about collaboration between the aerospace sector and the education system to cultivate the next generation of talent needed to bridge the skills gap. Chaired by John Watton, Chair of the People & Skills Working Group, Aerospace Growth Partnership and Technical Capability Director at GKN Aerospace, the group discussed the opportunities available and the hurdles holding back both academia and industry.

Jones reiterated the point made several times over the course of the conference that young people's career choices are influenced as early as age five. "So I think primary schools are really key targets for us and that is why the CAA STEM programme is working with the rest of the industry to try and provide a central place for young people, teachers and parents to go to in order to provide different activities, including interactive things, like outreach."

Meanwhile, RAeS CEO, Edwards noted. "We are a very, very small industry, but we are very disjointed in the way that our sector goes about outreach programmes. There are now around 140 aviation and aerospace charities in the UK." (The RAeS is hosting an event on 1 December to convene as many of the aerospace charities as possible to discuss how best to collaborate). Hornsby agreed with this viewpoint, explaining that an organisation may go into a school to deliver a presentation and consider that a success. "They have done their bit for the community," she suggested "but that is one interaction with a group of young people who may never see them again – so what happens to those who had their interest sparked? In a separate panel, British Airways airline captain, Guy Bowen recalled a recent visit to a STEM event at a school in the north of England with two female airline pilots. They asked a group of girls who wanted to be pilots and "not a single hand went up." A teacher then asked who wanted to be cabin crew and all the hands went up. "There is obviously a corporate responsibility," explained Bowen, "but I think also there's responsibility in the home and in schools. It is important to educate and inform teachers and parents as those ambitions start at home."

The apprenticeship route

The second day of the conference started with a focus on apprenticeships and skills, beginning with a keynote address by Jonathan Mitchell, Deputy Director for Advanced Manufacturing, Defence & Construction at Skills England.

A government agency, Skills England works with partners to create "better skills for better jobs" and Mitchell was quizzed at length by members of the audience on a variety of topics. Mitchell confirmed that Skills England was "working at pace to address those challenges."

A follow-on roundtable titled 'Leadership and professional development' included input from a panel including EUROCAE Director General, Anna von Groote, BA Speedbird Pilot Academy Lead, Guy Bowen, and Air Cdre Robin Caine, Head of Flying Training with the UK Military Flying Training System.

Bowen explained that in the three years since the Speedbird Pilot Academy was mooted it has received more than 60,000 applications and 400 cadets have begun their training, with the first starting Airbus training just weeks before the conference. Meanwhile, Air Cdre Caine said "I want the best ideas... I want the best people to work alongside me so that we can do our job properly. In my years in the RAF we have radically changed who can contribute and I think that cognitive diversity is where you get your 'edge'."

▲ Read the full report of this two-day conference online by scanning this QR code.

◣ Airbus predicts a cumulative need for 2.35 million new aerospace professionals by 2044.

Alex Bielinski/RAeS

▼ Aerobility CEO, Mike Miller-Smith MBE and one of the charity's ambassadors, former BBC reporter Geoff Spink, provided a valuable insight into how its Aerobility's Equal Skies Charter is providing positive intervention to show people with disabilities have skills which are very attractive to the aviation sector.

The next generation perspective

With much of the discussion at the conference focused on the need to recruit a new generation into the aerospace sector, it was perhaps fitting that one of the key sessions was hosted by RAeS' Next Generation Board Chairman, Robin Saaristo and gave a voice to young members themselves. **SOPHIE SOMERVILLE ROBERTS**, a 19-year-old student from UCL, offers her thoughts on a fascinating discussion.

'Perspectives of the next generation of aerospace professionals' featured a number of apprentices and recent graduates who spoke plainly about their experiences entering and working in the sector. Master's student, Angel Elsa Mathew and Aerospace Engineering student, Adelaide Rebelo debated the issues their generation face with two Leonardo Helicopters apprentices – final year Engineering Degree Apprentice, Sienna Simpson and third year Transmissions Craft Apprentice, Reece Diboll. Across the conference, there had been several panels that provided visibility and opportunity for discussion and, while this session continued the trend, it enabled a direct two-way discussion between the young people and industry representatives.

Listening to the panel and the following Q & A, I can safely say that it felt like a real conversation with young professionals and not a staged 'youth perspective segment'. That matters for the future of the aerospace industry, as ever more warnings are sounded about a wave of imminent personnel losses through retirements with no substitute influx population. The discussions often had in response to these concerns – discussions on talent pipelines, workforce resilience, and driving up recruitment rates – too often happen around young people rather than with them.

The entire conference highlighted the value that being in the same room can bring, as a clear example that by creating a genuine equality of footing, young people could talk directly to their leaders in industry. These open conversations help the industry understand how they were found, what attracted young people, and what got them committed enough to submit an application and go through with all the steps that long selection processes can have. For the young people there, they can find out more about their field from experts in the know, who will be aware of the field and opportunities that those starting in their careers are not.

Alex Bielinski/RAeS

Witnessing this panel and the networking that was happening afterwards, I left the President's Conference feeling that the RAeS was doing key work in a field where it has a distinct edge. Our decision-makers have their careers behind them, which means great knowledge but little current experience of what the entrance system is like. By bridging that gap, then places, such as the RAeS President's Conference, act as necessary centres to help ensure the aerospace industry is still able to draw in new joiners to all its various inner sectors.

The more first-timers we onboard, the more peer-to-peer advocacy we create, which can help with growing the interest in aerospace that young people feel. Events, such as this RAeS conference, act as sounding boards for young people to talk with real people, and not send off hopeful cold messages on LinkedIn, assessing whether the field is for them. They want to see that their skills are legible (data, systems thinking, human-machine teaming), that their time is valued and that the culture rewards initiative, not just seniority. I left the conference energised, not because the sector has solved its pipeline problems but because the mechanism to solve them is already in our hands.

Net zero workforce

In recent years one of the key areas of focus for the aerospace industry has been the push towards net zero. It was, therefore, interesting to hear a panel debate between industry and academia, discussing the attributes and expertise required to drive the sector's transition to emission-free flight.

Chaired by the founder of aviation charity, Flight Crowd, Mariya Tarabanovska, the discussion featured Rachel Gardner-Poole OBE from EmPower Flight and Cranfield University's Mark Aizlewood. "People are at the heart of every innovation, every sustainability target, every ambitious net zero pathway," explained Tarabanovska "and it is the people who will deliver on those innovation positive changes."

Gardner-Poole told the audience: "Our focus is preparing the next generation for a connected world," adding: "We talk a lot about aircraft, fuels and airspace but technology alone will not get us to net zero. We need people who understand these innovations and how to operate them safely and efficiently." Aizlewood pointed out that tuition is changing and so is what students want and need to learn. "Knowledge is now commoditised," he told the audience, "I can get all the knowledge I need on ChatGPT. I can do an open book test because, I can find an open book in the real world. I do not need to do a test without a calculator because I always have one on my desk."

Moving forward, Aizlewood suggested we focus on teaching skills and safety. In terms of net zero, he proffered that "it is all about pace. We have got to go quick, we have got to be bold and we have got to be brave. So we need to train people to be quick, bold and brave."

As one young delegate summed up, 'the conversations that begin at events, like the President's Conference, can shape who shows up to build, certify and fly the next decade of aerospace. We now need to move forward and make sure more of the next generation know that they are not just allowed in the room but that they are expected.'

Democratising SAR from space

Once a high-end spy satellite capability fielded by superpowers, Finland's ICEYE is now bringing commercial all weather day/night Synthetic Aperture Radar (SAR) imagery to government, military and other customers. **TIM ROBINSON** FRAeS reports.

Twenty-five years into the 21st Century, and it is worth reflecting that the average consumer now has capabilities that a spy agency of the late 20th Century would have killed for. Full colour, high-resolution satellite imagery, once an early 'wow' spectacle on 'the internet', has evolved into a ubiquitous modern-day tool – used by everyone and anything from local businesses to gaming, data journalism and since the invasion of Ukraine in 2022, community OSINT analysts. The 'democratisation' of satellite imagery via new commercial providers has brought a new-found transparency to world affairs – troop build-ups can be publicly counted, secret airbases kept tabs on, illegal logging tracked and war crimes recorded – with few restrictions. Despite the explosion in commercial satellite imagery, demand has soared to keep up as newer capabilities come online, such as even higher resolution and moving video from space – with downstream data and imagery services exploding as result.

However, this has been mainly through electro-optical cameras and sensors, which come with two big drawbacks (that they are blinded by clouds and night), giving opportunity for nefarious actors to move or conduct operations at night or in bad weather. With extensive cloud cover in the northern Hemisphere, temperate zones and some 60-70% of the world clouded over, this means, despite the plethora of private and government imagery satellites staring down at the Earth, 24/7 coverage of critical areas of targets when it is really needed is not guaranteed.

The solution is Synthetic Aperture Radar (SAR) satellites which use radar instead of optical cameras to pierce clouds and night. It is particularly good at detecting metallic objects against natural backgrounds.

The first government SAR satellite was NASA's Seasat, launched in 1978, followed by the first commercial one, RADARSAT-1, in 1995. However, these satellites were large, expensive and the raw SAR imagery also required extensive training and skills from human analysts to interpret these images, compared to imagery from optical satellites. The result, until fairly recently, was that SAR satellites were the preserve of superpowers, international science missions or space probes to other planets.

▶ The Palm, UAE as imaged by an ICEYE SAR satellite.

◀ ICEYE's Gen4 satellite is suitcase-sized with a large phased array antenna.

▼ The Gen4 satellite features 16cm SAR resolution.

Enter ICEYE

That was, until Finland's ICEYE entered the chat. Founded in 2014, it now owns and operates the world's largest SAR satellite constellation and employs around 900 people with offices in Finland, Poland, Spain, the UK, Australia, Japan, UAE, Greece and the US. First formed to track the extent of seaborne ice (hence ICEYE) as a spin-off from Aalto University, in 2018 it launched ICEYE-X-1 – the world's first SAR microsatellite, weighing under 100kg. Since then, it has seen a further 53 satellites launched into orbit for its own and other customers – mainly through SpaceX rideshare missions.

Suitcase-sized and weighing only 120kg, ICEYE's mini-satellites extend a 3m deployable antenna once in orbit, with their minute form factor packing huge capabilities in a small spacecraft.

ICEYE is rapidly fielding new satellites with higher levels of resolution – from the Generation 2 with 1 metre resolution, the Gen 3 with 50cm to the Gen 3.5 with 25cm. In September, the company launched its first Gen4 satellite, which delivers the highest-fidelity commercial SAR imagery of up to 16cm resolution. Able to capture up to 500 images a day, it has also been designed to be deployed at scale, to allow sub-15 minute repasses – giving almost real-time ISR capability. Gen4 also features a larger antenna which increases the wide area scan by 250% from 150km to 400km.

The satellites, unlike other SAR spacecraft, use a phased array antenna instead of a circular parabolic one, which sets limitations on the size of the image footprint on the ground. The phased array antenna also supports a wider range of modes, such as Dwell, Spot imaging and Scan Wide. Earlier this year the company launched Scan Wide mode, which allows 60,000km² to be captured in a single image. This, with a 27m resolution, is particularly useful for maritime surveillance and large area ISR – allowing operators to then 'zoom in' with the higher resolution modes.

Broadening range of customers

The capability of these new generation of SAR satellites has led to a growing portfolio of military, government and commercial customers who are realising the value of this data to complement existing EO/IR imagery satellites. These include NATO, the Finnish Defence Forces, the Brazilian Air Force, the Royal Netherlands Air and Space Force, Poland (which is buying three) and the Ukrainian military – which has access via the German-funded Rheinmetall constellation. Commercial and government customers include Saab, Eagle Technology, Aon and the US Centers for Disease Control and Prevention (CDC) – which uses SAR data to track floods.

John Cartwright, SVP & Head of Data Product, ICEYE, attributes the revolution in commercial SAR to three factors – the geopolitical context, the 'democratisation' of the SAR product and ICEYE bringing a "high-value, very innovative disruptively priced product to market."

Key in the latter point, explains Cartwright, is "the whole new space paradigm of lowering the cost to put assets on orbit, including, for example, the ability to take advantage of rideshares," as well as the "different technologies and different philosophies in terms of the design of the spacecraft."

Taken together, this is opening access to sovereign space capabilities in ISR that previously only existed at the superpower level. Says Cartwright: "Customers who are historically electro-optical consumers, who have maybe dabbled in SAR, are increasingly understanding that SAR is a powerful complement to their electro-optical missions."

Deskilling the analysis

However, it is not just in the design of spacecraft that ICEYE is powering ahead with innovation – but also in the processing, analysis and interpretation of SAR images, and particularly though the use of AI. Says Cartwright: "We want to make SAR easy."

For instance, ICEYE announced that it would ship a toolset of SAR 'shapes' that show what common vehicles, ships or aircraft look like under various conditions, such as night-time or bad weather – effectively a 'map legend' that will allow users to quickly interpret the raw images.

"We're going to deliver for our customers a bundle of imagery pixels and then also shape files that represent what's in the imagery," Cartwright says. "We're building imagery derivatives which abstract a lot of what's in the imagery and gives customers what they really want to know, which is what's going on inside the image."

The next stage, notes Cartwright, is using AI to help classify the images, drawing attention to anomalies or tracking ships and vehicles from points of origin. In September, ICEYE with SATIM, revealed a new product called 'Detect & Classify', which uses AI to automatically detect and classify vessels, vehicles and aircraft with "over 90% accuracy." This auto target recognition eliminates a long-standing bottleneck in SAR exploitation – that of skilled human imagery analysis to deliver actionable and timely insight.

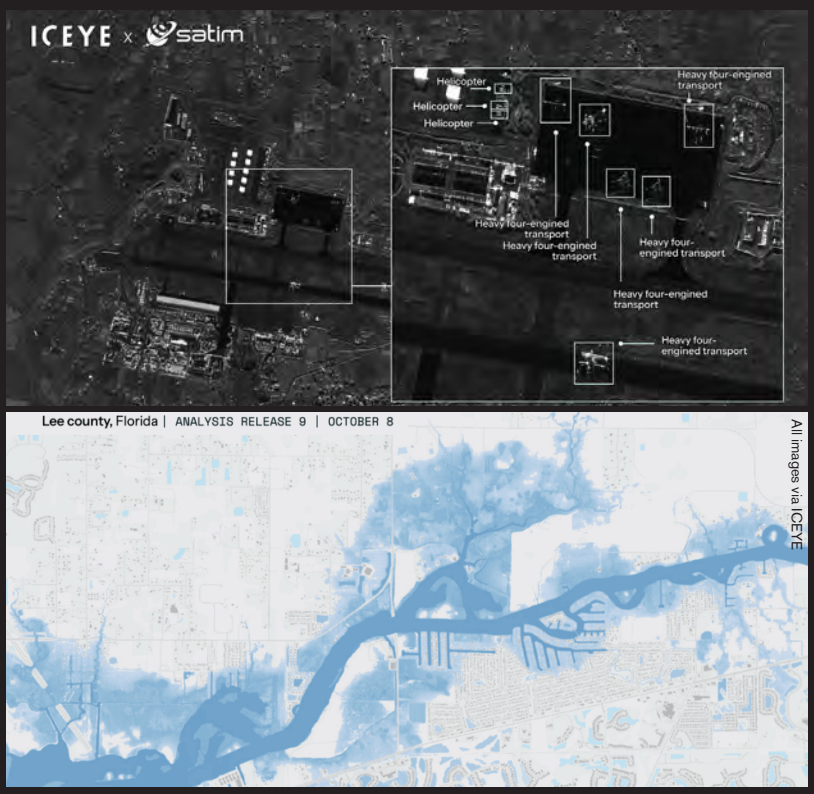
He explains that "AI is a central pillar to this vision and the partnership that we have with SATIM is all around AI-based image exploitation technology. We have high expectations that this is going to have a catalytic effect on the ease in which customers consume SAR imagery."

Cartwright muses that, in time, SAR-derived actionable intelligence to high-level decision-makers or commanders might even not need imagery itself, saying "maybe customers don't want the imagery at all." Instead, it might just be a report that says a 'certain ship of interest left port on XX and is heading towards Y' or that 'X number of aircraft have been counted at a certain airbase. He adds: "We expect the delivery of these types of AI-based image derivatives to broaden the market for the consumption of SAR. That's really the name of the game."

Bringing it to the tactical level

One of the core strengths of SAR, such as finding fleeting targets at night or in bad weather (unlike EO agriculture or climate mapping perhaps conducted over months), means any intelligence derived can be rapidly out of date – as ships transit, tanks and vehicles shift positions or aircraft redeploy to new airbases. However, using traditional 'strategic spy sats' for these time-sensitive tactical missions, where the mission control and intelligence is located at the national level, can be a bottleneck. Additionally, the satellite operations (which control the tasking and sensor pointing) and analysts can be working in silos.

To address this, in September, ICEYE revealed its ISR Cell – a deployable SAR satellite mission control and analysis station that allows units in the field, down to a division level, to have direct access to this timely actionable imagery. The standard ISO container has four workstations for a team leader, tasking, analyst and reporting/dissemination, allowing for lower-level units to benefit from the 24/7 capabilities of SAR imagery. This ISR Cell deployable command and analysis centre was demonstrated in September at the NATO Tiger Meet exercise in Portugal.



▲▲ AI automation target recognition tools can now detect and classify objects imaged by the SAR sensor – speeding up analysis and actionable intelligence.

▲ Flooding in Florida measured by an ICEYE SAR satellite.

All images courtesy of ICEYE.

Commercial uses

With the ability to pierce the cover of night and adverse weather and to find and track metallic objects that may move, the applications for military customers are obvious but ICEYE also has commercial and government customers, particularly for disaster relief where urgent information about flood levels is needed or the tracking of wildfires. Insurance companies are also another market, for assessing payouts and claims after natural disasters, with the energy and utility sector also interested in how SAR imagery can help protect critical natural infrastructure from flooding.

Another capability of SAR is the detection of oil slicks on water, due to the fact that it changes the reflective properties of the radar return. This is highly useful for assessing environmental damage for accidental spills, but also illegal dumping, pollution or even ship-to-ship transfer of oil by 'dark fleets' breaking sanctions.

Summary

In short, thanks to innovative satellite design, disruptive pricing, lower launch costs and insatiable demand for 24/7 ISR coverage from space, ICEYE is now bringing this critical capability to a far wider set of users than previously. With the introduction of AI, it is also set to bring actionable intelligence and data to users far quicker than before. Cartwright sums up ICEYE's mission: "We just want to make SAR easy and we're well on the path to doing that."

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AER DOGS

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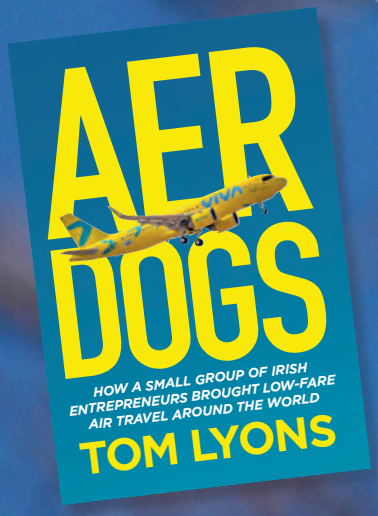

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Are airfields electric?*

Is a fully electric airfield feasible? **DAVE UNWIN** investigates Gravitational Potential Energy and how it can be used to reduce the cost of recreational flying.

I first started thinking about electric glider tug aircraft and the possibilities of regenerating energy many years ago. I was (and indeed still am) the Tug Master for the Buckminster Gliding Club, and we do a lot of aerobatic tows. If the launch profile has been flown correctly, the glider releases 'in the box' at 4,000ft AGL, more or less directly overhead the airfield.

I was flying a Robin DR400 Remo that day so on the tows when I had full fuel I essentially had about 750kg of mass at 4,000ft above my intended touchdown point. That is quite a lot of potential energy or, to be more precise, Gravitational Potential Energy (GPE). This is a term physicists use to describe the energy stored due to an object's position in a gravitational field, such as a ball held above the ground or, in this case, a tugplane high above the runway. The higher the object and the greater its mass, the greater its gravitational potential energy.

Lost potential energy

Unfortunately, as I had no method of storing that energy all I did was convert it into heat and noise, doing nothing for the club, its neighbours or the environment. I often fly 30 tows per day so that is 22,500kg of wasted energy.

Even more irritatingly, I had to carefully monitor the cylinder head temperatures (CHTs) to avoid shock cooling the engine and my ground track (to avoid shocking the neighbours) and the gliders (to avoid a real shock). There had to be a better way.

Ideal world solution

In an ideal world, I would be flying a tug powered by an electric motor and fitted with a reversible propeller. Once the glider had released you could simply pull the throttle all the way back past idle, through a gate or detent and into 'Regen.' The propeller would then reverse and the motor would now become a generator. Not only would this create a phenomenal amount of drag, greatly increasing the descent rate without increasing the airspeed, it would also improve the launch rate and – most importantly – the energy generated would be emission (and cost) free.

Obviously, given the limitations of current technology, the system would not be able to store even half of the potential energy – a thermal runaway would be inevitable. However, if you could regenerate and safely store even 5% of the energy, every 20th tow would be cost-free – transforming the economy of the gliding club. If the club conducts 2,000 tows a year at £40 per tow that is a significant saving.

Of course, the same principle applies to parachute drop aircraft where a typical Cessna Caravan at 14,000ft more or less directly overhead the airfield possesses a tremendous amount of GPE.

Regenerating ideas

The science behind regenerating energy has been around since 1887 (see box below) and was first used in trolley cars. It has subsequently found its way into vehicles as varied as electric bicycles to Formula 1 racing cars and is today primarily found in trains, as well as both hybrid and fully electric cars which have the ability to return energy in the form of electricity to the vehicle, where it is stored in a battery.

In the aviation world, the technology needed for an electric tugplane with the ability to regenerate is not only very close to reaching fruition, it may already exist.

For example, a Bristell Energic is currently flying powered by a H55 electric propulsion system. This consists of a single

*with apologies to Gary Numan

Regeneration

Regenerating electricity is the process of capturing energy that would otherwise be wasted and converting it back into a usable electrical form.

A particularly useful facet of an electric motor is that, when it runs in one direction, it converts electrical energy into mechanical energy that can be used to perform work, such as turning a propeller. When the motor runs in the opposite direction, a properly designed motor becomes an electric generator, capable of converting mechanical energy into electrical energy. This electrical energy can then be fed into a charging system for the batteries.

Regeneration was invented by Frank Sprague, who in 1884 founded the Sprague Electric Railway & Motor Company. Sprague had been working for Thomas Edison but soon realised that his interests were more aligned with power and transport, rather than lighting systems. Sprague introduced two important inventions: a constant-speed, non-sparking motor with fixed brushes and regenerative braking. Regenerative braking was first used by Sprague on trolley cars and trams but he soon realised another application was the electric elevator.

Bristell

◀ Bristell's electric-powered B23 Energic would make an ideal glider tug; in fact, avgas-powered versions of the B23 are already in use with gliding clubs.

liquid cooled electric motor turning a DUC Hélices three-bladed propeller, with the electricity stored in rechargeable lithium 49kWh batteries located in two permanently installed packs for redundancy. The system has a maximum power output of 100kW (134hp) and more pertinently a 'Max Continuous' of 80kW (107hp). Bristell claims a MAUW of 850kg and a payload of 190kg but, when towing its take-off mass, would be typically around 100kg less. This is the same mass as the Remo, although of course that does boast 46hp more even if the old propeller was sub-optimum.

With the right propeller, I think an Energic would offer comparable performance to a Remo – but only for two or three tows and thereby lies the difficulty.

Battery potential

The perennial problem facing electric aircraft is energy density – the motor technology is more than up to the challenge; it is the batteries that are the issue. It is simply irrefutable that a litre of avgas weighs 0.719kg (a litre of Jet-A1, diesel or SAF is slightly heavier at around 0.8kg) and all those fuels contain a phenomenal amount of energy when compared to even 8kg of batteries. However, battery technology continues to improve, just as the jet engine did. The first jets had a time between overhaul (TBO) of around ten hours, but this soon rose to 100 and within a decade to 1,000 hours. I am certain that battery technology will eventually mature to the point that light GA electric aircraft are as useful as those powered by combustion engines. Every electric car that comes onto the market has better range than its predecessor.

I have tested several Bristell airframes and have often thought they would make a good tug. Designer, Milan Bristela agrees – and his company does indeed offer a dedicated tug version – albeit powered by a Rotax internal combustion engine. So, is the electric tug that far away?

Of course, the reversible prop and a motor that switches to a generator might vex the regulator somewhat. If it did jam in 'Regen' mode, safely flaring the aircraft would not be easy and would require the pilot to approach at about twice the stall speed (VSo x 2).

However, a simpler, cheaper and safer method would be for the pilot to simply pull a lever that mechanically extended a Ram Air Turbine (RAT) into the airflow to turn a small generator which would replenish the on-board batteries. This, again, is a technology that has been used in aviation for decades.

The green airfield

Sport aviation is a very easy target for climate change activists and environmentalists and, although gliding is possibly the greenest air sport, there is still room for improvement. So apart from an electric towplane, what else can be done?

▼ France's Aura Aero also sees potential for its IntegralE as an electric-powered tugplane.

Aura Aero

Aerovolt

Pipistrel

Powerful electric winches are already in service and the vehicles used to move the gliders around on the ground are often electric. Even the clubhouse and its amenities (such as the showers, ovens and phone recharging points) could all be electric.

Yet all these electric devices need power from somewhere. In 2024 I attended a talk at the British Gliding Association (BGA) annual conference by Jens Trabolt. He is also a firm believer in making gliding even greener and pointed out that airfields are often windy, hence perfect for wind turbines. Needless to say, any windmills that were upwind of the launch point and landing area would need to be caged while gliding operations were taking place but, with a windmill on each corner of the airfield, two would always be in service (and of course they would run all night). Power generated could be stored in batteries or fed back into the National Grid.

Other green technologies could also come into play at our proposed 'emission free' airfield. Large hangar roofs are ideal for solar panels and for heating water and, as water shortages may become more common, all the gutters on the hangars should feed into a 'grey water' system for showers, toilets, etc.

▲ Hundreds of kilos of Gravitational Potential Energy ready for the taking.

◤◤ British company, Aerovolt is rolling out a network of electric aircraft recharging stations at airfields across the UK and overseas.

◤ While Pipistrel is better known for its Electro two-seat trainer, it also manufactures the Taurus electric SLMG, which can be charged from solar panels mounted on its trailer.

Gravitational Potential Energy at work

Whenever an electric aircraft is moving it has kinetic energy. Meanwhile, its mass and height above the ground give it Gravitational Potential Energy (GPE). While the tug tows the glider up it uses the electricity stored in the batteries to turn an electrically-controlled, constant-speed propeller. Once the glider releases the tug descends and the propeller and motor reverse roles – instead of using electricity to turn the propeller, the propeller now turns the motor, which now functions as a generator, producing electricity which is sent back to the battery for later use. This system increases overall energy efficiency by reusing energy that would otherwise be lost as heat and by reusing energy it reduces the amount of energy that needs to be produced from other potentially less efficient or polluting sources.

Along with the electric tug and winch, electric Self Launching Motor Gliders (SLMGs) very much lend themselves to the regenerative technologies described above. A modern motor glider – such as the JMB Phoenix or Pipistrel Taurus – when based on or near a reliable ridge could almost fly forever by simply regenerating power in the ridge lift. Such a machine could also regenerate when soaring in wave or even on strong thermic days. An electric SLMG with the ability to regenerate could operate very cheaply and quietly, while consuming no fossil fuels and producing zero emissions.

Of course, the physics of GPE, allied with the science of regenerative technologies, really lends itself to gliding but, with reliable charging infrastructure already in place, such an airfield could also be used by electric trainers, like the Bristell H55 and Pipistrel Electro (see p42), the latter already in commercial use.

With the sophisticated electronic and powerful electrical systems in place to run the all-electric gliding club, it is only a very small jump to catering for the charging needs of other electric-powered light aircraft, eVTOLs and even passing electric road vehicles (one of the problems which often dissuade potential EV purchasers is the paucity of charging options).

Range anxiety

I have tested two different electric aircraft – the Pipistrel Electro and the Enable Kub prototype and, to be fair, while they both gave the expression 'range anxiety' more gravitas than when used while talking about a car, I saw – and still see – their potential. However, for large commercial aircraft, pure electric propulsion is still some way away.

Whereas I think the airliners of the 2040s will have huge, ducted fans, turned by electric motors, powered by SAF fuelled gas turbines, I hope – indeed expect – that glider tugs will be electric and feature regenerative technology.

Airjuice Photography/WikiCommons

A taste of electric flight

Earlier this year, David Chinn FRAeS became the first RAeS President to fly in an electric-powered aircraft. **TIM ROBINSON** FRAeS reports from Fairoaks.

Tim Robinson/RAeS

Aerovolt

Read enough autobiographies of WW2 pilots and one thing jumps out – the number of them that caught the flying bug thanks to an 'experience' flight in the early days of aviation. Most famously popularised by Sir Alan Cobham's 'Flying Circus,' which toured the UK, Ireland and South Africa, it is thought to have given almost one million people their first taste of flight. For a relatively tiny sum, the public would be taken aloft, seeing their homes and town from the air and opening their eyes to the future of flight. Something Cobham referred to as 'airmindedness.'

Fast forward to 2025 and ex-RAF pilot and Flexjet business aviation executive, Adam Twidell, is following in the footsteps of these flying circus' – by giving people a taste of zero-carbon future of flight in a super quiet, electric aircraft.

Earlier this year, RAeS Past President, David Chinn, became one of these band of new electric flight pioneers when he was taken aloft in a Pipistrel Velis Electro from Fairoaks Airport, UK by Twidell as part of Flexjet's sustainable aviation consultancy spin-off 4AIR. This is thus believed to be the first flight of a RAeS President in an electric-powered aircraft.

▲ RAeS President 2024-25, David Chinn, prepares to fly in the electric-powered Pipistrel Velis Electro.

Enter the Electro

Operated by Synergy Flight Training at Fairoaks, 4AIR has been backing these demonstration flights as a way to introduce both aviation professionals and the wider public to the potential of these first-generation electric aircraft and revitalising both recreational and flying training. Says Twidell: "The idea is to get the message out that electric aviation is here. It's in its infancy, but you can fly on it today," adding: "I've flown military pilots, airline pilots, brand new students and people who have just been coming here to look at aeroplanes."

In addition to demo flights, the 4AIR-sponsored Velis Electro will also be available for Synergy Flight Training student pilots to conduct flight training – with the all-electric aircraft able to cover three-quarters of the PPL syllabus.

The Velis Electro is a two-seat aircraft developed by Pipistrel (now part of Textron) that, in 2020, became the first electric-powered aircraft to receive type certification from EASA and FAA – with the 100th example delivered in 2024.

The Electro is certificated for day VFR operations only, and like a glider has no navigation lights or beacons. It is therefore a surprise when the propeller starts immediately turning with no warning. It has a fully certified electric engine that produces 57.6kW of power – equivalent to around 78hp. It is not only ultra quiet at 60dBa (this correspondent had to watch the skies carefully for its return as there was little audio warning) but the electric motor also results in highly affordable running costs. As part of the partnership at Fairoaks, 4AIR is also offsetting emissions caused by recharging.

Maintenance costs are low and a full battery charge costs a few pounds. A charge time of around 45 minutes allows fairly quick turnarounds between coffees or lesson debriefs. However, with 50 minutes endurance, like electric cars, 'range anxiety' is an issue and Twidell admitted that he informs ATC that he is in an electric aircraft when approaching an airfield, as a way of letting controllers know that his diversion options may be more restricted.

However, there are now over 12 airfields in the UK with electric charging stations and more coming online to meet the expanding eVTOL and advanced air mobility sector. Moreover, as was the case with the first generation of iPhones and Teslas, endurance is likely to improve as newer and more efficient batteries are rolled out.

Argues Twidell: "Why aren't all flying clubs operating this aircraft? Because it costs nothing to fly and it does not go wrong. A modern electric motor is super-efficient and reliable." For private flying clubs, shared ownership, flying training schools who are looking for a new two-seat aircraft for short hops or for the majority the PPL course, the Electro offers the tantalising prospect of cheap flying, minimal maintenance, ultra quiet operations to fit in with local communities and the satisfaction of being a pioneer in electric flight.

Will Gen Z fight in WW3?

Recruiting a next-generation air force

With the rise of autonomous weapons and social contracts across democracies straining, University College London (UCL) student, **SOPHIE SOMERVILLE ROBERTS** asks if Gen Z will fight in any future WW3?

News reports, such as a recent *Daily Express* poll finding 52% of British 18-24-year-olds are unwilling to serve[1], build a strong argument that Gen Z is averse to fighting. Their willingness is seen to be constrained by the economy, national identity, perceptions of a 'just' war and their risk-averse nature – all of which is seen to be holding back a generation's 'readiness.'

It is, of course, a complex issue. However, due to the scope of the question, this article will focus primarily on volunteer (not conscripted) recruitment – which shifts the focus from 'Will Gen Z fight in WW3?' to 'Will Gen Z 'volunteer' to fight in WW3?'

Beyond polling data, supporting evidence can be found in a live war zone. A new initiative from Ukraine, 'Contract 18-24' is aiming to target Gen Z and bills itself as "an opportunity for people to make a conscious choice" to join the Ukrainian military.

With cash and lifestyle perks (such as 0% interest rate mortgages), it targets those younger people currently exempt from conscription[2]. The scheme highlights that even with a proximate Russian threat it may not be enough to mobilise some of Gen Z.

Activist generation

However, there is a risk in developing an exaggerated, doomist belief in Gen Z's attitudes to joining the military. In fact, Gen Z is an activist generation, often motivated by noble causes. Facilitated by social media, Gen Z can bring attention to causes, mobilise movements and co-ordinate

Crown Copyright/Tyrone Jones

▼ For the first time in recent history, the RAF is expanding, but can it find the right recruits?

internationally. Gen Z has a high level of personal agency, which is often overlooked in coverage of its low willingness to enlist in the military.

For this article to give an accurate answer, we must balance our assessment of Gen Z's unwillingness to serve against the reasons they may enlist, and determine which factors win out. To start, we will look at what drives the unwillingness.

What holds Gen Z back?

To understand what is driving the unwillingness to enlist in Gen Z, it is important to understand what makes them a unique age cohort. Born between 1997 and 2012, they are the first generation of digital natives (individuals born and raised entirely in the digital age). They have been shaped by shock after shock. The events of 9/11, the 2008 Financial Crash, Brexit, Covid and the return of war to Europe have all occurred before Gen Z have turned 30.

When considering the prospect of warfighting, the reference information Gen Z has is Afghanistan and Iraq. The mainstream wars of their youth and the controversial legacy of both interventions has tightened the criteria by which Gen Z deems a conflict 'just' and heightened suspicion toward new conflicts.

Covid has also reset Gen Z's expectations of state capacity. The pandemic led to international co-operation and large-scale resource mobilisation to save lives. With numerous non-military ways to resolve issues, it is hard for Gen Z to believe that war is the only option left to a state with recently proven capacity.

In addition to this drawback, Gen Z is also hampered by rising nihilism. They are hardly the first generation to experience economic shocks, unaffordable housing and widening inequality. They are, however, the first to do so as digital natives.

Thus, social media platforms have intensified comparison and FOMO (fear-of-missing-out) culture. This has fuelled perceptions of inequality among Gen Z. The effect is to reduce the size of its community based on comparable economic and social status.

This reduction in community scale is not simply due to economic factors alone. While social media facilitated the formation of online global communities around shared interests and niche topics, it has also served to weaken traditional community structures that Gen Z has offline. The mobilising effect of a threat to a shared community is, thus, weakened within the generation, whose communities are small, geographically dispersed and online.

Comparison culture not only shrinks community size but also facilitates a 'keeping up with the Joneses' arms race online. Micro-trends and viral accessories (such as Labubus) are signals of economic and social status. Greater transparency on pay and conditions in the armed forces (via salary and job review platforms) exposes unfavourable comparisons with civilian work, including the real state of benefits, such as military housing. Where service entails a net loss in comparable income or status, Gen Z's interest falls further away.

The irony is that the most understaffed posts, such as those in aviation, logistics or engineering are all exactly the purposeful and practical roles many Gen Z candidates want. Yet if a recruit cannot even ensure they will receive warm and dry housing, joining becomes a calculation where patriotism or a desire to serve must outweigh measurable losses.

War via TikTok

Finally, looking at warfighting itself, recent developments have changed Gen Z's picture of war. Drone strikes and other military content are laid out for

▶ Recruiters are now targeting Gen Z – but authenticity is key.

them in 60-second videos on social media channels, such as TikTok. With so many images, videos and angles, the scale and complexity of war are expanded. For Gen Z, it may be difficult for a recruit to feel their presence makes a difference in such a large theatre.

Furthermore, the footage flooding Gen Z's For You pages (FYPs) is intimate and unforgiving. FPV-drone footage can show the face of the targeted soldier as they die. The first-person viewpoint places the guilt burden on the viewer themselves. The possibility that they would be confronted daily with war's intimate costs (a likelihood thanks to their gaming-native skills and the rise in drone warfare) arguably pushes many away from serving.

Finally, drones and the rise in chatter about autonomous systems may shift Gen Z's willingness to enlist – particularly in air arms that are pioneering uncrewed warfare. Gen Z is wary of investing heavily to qualify for aviation roles, only to find pilot duties shifting from flying to monitoring, with actual flight hours contracting. It makes individuals ask themselves whether giving their all in pilot recruitment is worth it if the job may be obsolete by the time they reach a front-line squadron?

Altogether, Gen Z's age, digital nativity and the realities of modern war might be argued to jointly depress recruitment.

What encourages Gen Z towards service?

As it stands now, UK MoD age profiles show that at least a quarter of regular personnel are members of Gen Z, with recent officer intakes overwhelmingly aged 18–29. Among other ranks, over half of the new joiners were under 20 in the year to September 2023.

At the same time as this new generation is coming to dominate the intake, recruitment applications are up sharply too. The British Army logged 170,380 regular applications in the 12 months to 30 September 2024. This is a 94% jump on the prior year, with the RAF's applications up 29% across a similar window[3].

This suggests that Gen Z (while not solely driving the rise in recruitment) does not lack any motivation to serve. Rather than revisiting standard enlistment pulls, it is more useful to show how this cohort's life stage and digital-native status shape those drivers.

One of the likely factors motivating this generation is the content coming from the war in Ukraine. Real-time reporting on social media can flood their feeds with videos of drone strikes on residential buildings, generating a perception that war has moral permission (when violence is justified by the righteousness of the fight). With Gen Z using social media as a primary news source, the desire to fight may be strengthened through the lens of Ukraine defending itself against an aggressor.

However, there is an important caveat: social media is a double-edged sword, and the very platforms that strengthen Gen Z's willingness to fight can also reduce it. In Ukraine, the visuals of war have rallied international support for the country. Meanwhile, the sharing of images from Gaza has prompted intense criticism of the Israel Defense Forces and the Israeli leadership. The core narrative and its factual foundation are essential for social media to serve as a help and not a hindrance, and it is a factor that must be monitored in its use.

Closely tied to this, image-first media can also assist in strengthening social permission (the permission of society to fight) within Gen Z. Taking again the example of residential drone strikes, such videos expand the perception of risk outwards from

◀ With images and video (including uncensored death videos) just a click away on Gen Z's social media – how do governments convince recruits that they would not be 'FPV drone fodder' in the next war?

a concentrated front to the whole populace. This creates a fairness in the burden of war across the whole population, irrespective of social background or personal wealth. When everyone is side by side in a fight together, it helps create implicit social permission.

Beyond digital nativity, the labour market still does some heavy lifting in attracting Gen Z. While the point on comparison culture stands true, they face sluggish growth, high housing costs and a saturated graduate market. The armed forces' offer of secure employment and steady pay becomes ever more attractive as the present economic situation declines and their belief in a future improvement diminishes.

Finally, it is not simply the perks of a military career that attract Gen Z (such as working with F-35s, Typhoon jets or MQ-9B Protector drones, which few have access to) but also the efficacy of those perks. Working across air defence, counter-UAS, SAR/ISR, drone operation and aerospace surveillance lets people have a direct, life-saving impact and make a difference.

Generation of gamers

Moreover, for Gen Z, skills in co-ordination, rapid decision-making, spatial awareness and multitasking are already well-developed, thanks to Gen Z being digital natives and video game players. Modern air defence roles commonly require information management at speed, with interfaces that feel familiar (multi-window views, controller-style inputs, voice comms). It is likely easier for Gen Z to turn their baseline into doctrine-level competence with targeted training. If they can see that their native strengths produce an outsized effect, then this could help Gen Z's willingness to serve, as they believe they are uniquely suited to the role and make a bigger difference.

Weighing up the two sides

Gen Z is an educated and highly media-literate generation that is connected internationally in real time. Any justifications given as to why they should fight, be it the pay, the perks, the purpose or the righteousness, are liable to be investigated and individuals within government or the military held to account.

Because Gen Z can verify so much data, appeals that worked to recruit older cohorts now need to withstand continuous public scrutiny. This is not to say that Gen Z will never serve; rather, appeals to service need to be finely tuned responses to the cadre's varied disincentives.

A useful shift is to move from messaging at Gen Z to structured, two-way engagement between the services and the cohort itself. Gen Z has grown up experiencing successive 'once-in-a-lifetime' shocks. They are now showing themselves to be a high agency cohort keen to represent their own interests.

By bringing Gen Z into the decision-making process, especially on questions translating gaming-native skills into drone operations, air- and space-surveillance, and human-in-the-loop autonomy, signals to them a resetting of the two things that most shape their decisions: trust and perceived personal efficacy.

Feeling cheated

For a more specific solution in recruitment, there is a need to highlight the intrinsic value of work. Many in Gen Z feel cheated that their hard work in attaining university degrees has resulted in a saturated graduate market. Rather than the promised graduate premium, many face underemployment or unemployment. A role in ISR chains, cyber incident response or air defence can appeal to this generation if it knows its work is already valuable, rather than

▶ Many online video gamers are used to co-ordinating multinational teams, developing tactics to fight and win virtual battles.

AIR DEFENCE IS HOME DEFENCE
GET A GOOD RISE BY JOINING THE R.A.F.
PAY 3/- to 18/- a day
Skilled Mechanics
Urgently Needed
Imperial Royal Flying Corps
A place for you with the flying team.
INTO THE '70s WITH THE ROYAL AIR FORCE
JOIN AIR & SPACE OPERATIONS
ROYAL AIR FORCE

▲ Recruitment for air forces has changed throughout the decades with the message changing for different generations.

having to wait three years in university to see the benefits of what they do.

These ideas are not radical, as recruiters already sell purpose. The problem is not the message as much as the messenger. The cynicism Gen Z has over the justifications and value of offensive force gives a suspicion towards traditional recruitment adverts. This dislike of official adverts also makes it socially safer to mock rather than endorse them.

The solution here may lie in the civilian world, where commercial brands have increasingly recognised the advantages of 'influencer marketing' over traditional advertising boards. Influencers often command higher rates of trust and engagement than scripted ads and offer the military a pathway to achieving peer-to-peer messaging. These creators should not be scripted or steered by press officers, or they risk being labelled inauthentic and the content seen as encroaching on Gen Z spaces. It is a collaborative but non-controlling use of influencers that offers the best chance at effective messaging.

Besides defence influencers, peer-created servers, group chats and societies can provide vital peer-to-peer social reinforcement for those considering enlistment, countering the dissenting voices in their lives that might discourage Gen Z from signing up.

University Air Squadrons

A ready-made society already exists in the underutilised University Air Squadrons (UAS). A campus-anchored community, a UAS lets the service-curious test the waters without full commitment. Not only can UAS provide word-of-mouth chatter, but also content created by its own Gen Z members. By building an authentic community, the tide of willingness can begin to turn as time delivers returns of trust, feelings of efficacy, skills training and purpose.

The future

As it currently stands, it may be argued that Gen Z is not intrinsically anti-war, but that it needs a higher level of convincing or justification before committing to serving.

Air forces need to tailor their recruitment strategies to persuade this generation of educated, social media savvy, digital natives that they are joining a high-tech, progressive service that will empower and trust them. They also need to persuade them that, should they need to make the ultimate sacrifice, the overall cause will be just.

This not only needs buy-in from recruiters, but also high command and politicians. The target audience is not just Gen Z themselves but their parents, teachers and lecturers who help shape their minds.

This is not a moral failing of Gen Z which – intended or otherwise – is the picture that some reports have painted of this generation. Attacking their behaviour or anti-war views will only depress their willingness further. It is instead our prerogative to see that a lack of will is not the same as no will at all. A minority of Gen Z is already serving and, with tailored approaches, this minority could expand to be a majority.

In conclusion, the doomerism about Gen Z's willingness to fight, while stemming from valid concern, is exaggerated.

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The RAeS has career guidance and resources available at **www.aerosociety.com/careers-education/** including interviews with those currently working in the sector. For members in their early careers, there are also opportunities to volunteer at aerospace events which the RAeS is involved in.

Afterburner

www.aerosociety.com

Diary

4 December 2025

RAeS Wilbur and Orville Wright Named Lecture

Dr Michael Winter, Chief Scientist, RTX
Royal Aeronautical Society HQ,
No.4 Hamilton Place, London W1J 7BQ

In the 100 years since Fred Rentschler formed Pratt & Whitney, the company has been at the forefront of aero-engine technologies, leading the way with a series of era-defining milestone projects. Now part of the RTX group, one of Pratt & Whitney's significant step changes in recent years has been the introduction of the PW1000G geared turbofan, which provided around a 16% improvement in fuel burn compared to earlier engines. RTX Chief Scientist, Dr Michael Winter, joins the RAeS on 4 December for the annual Wilbur and Orville Wright Named Lecture. RTX

50 Message from RAeS

– From our President

"One of the key messages I took from the Mental Health in Aerospace presentations was the fact that loneliness is a bigger problem for the health sector than smoking."

– From our Chief Executive Officer

"However you contribute to our work, please know that it helped us secure this award."

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Message from RAeS

OUR PRESIDENT

Alisdair Wood

▲ The President (right) with Hybrid Air Vehicles CEO, Tom Grundy, and the late-Sir John Charnley's daughter, Katrina Sudell, at the RAeS Bedford Branch Sir John Charnley Lecture on 9 October.
Sam Leather/RAeS

> One of the key messages I took from the Mental Health in Aerospace presentations was the fact that loneliness is a bigger problem for the health sector than smoking

The President's Conference is a major event in our Society's calendar and this year my theme was People in Aerospace, supported by the kind sponsorship of Airbus. People are at the heart of the aerospace sector, driving innovation, ensuring safety and shaping the future of flight. From engineers and pilots to technicians, researchers and policymakers, it is their expertise, creativity and dedication that turn ambitious ideas into reality. As technology advances and the industry undergoes rapid transformation, the need for skilled, adaptable and diverse talent becomes ever more vital. Ultimately, while aerospace is defined by its machines and systems, it is people who inspire, design, manufacture, support and operate them, making human ingenuity the most critical resource in the sector.

People in Aerospace was a huge topic to cover in just two days. The quality of speakers, panellists and contributors was most impressive. Also particularly pleasing was the diversity of speakers, panellists and delegates, achieving better representation of our Society than I've previously experienced, mainly due to the tremendous efforts of the Society staff coupled with the topics being discussed. Our panel of apprentices and students provided an essential input and showed that the voices of these extremely capable young people need to be heard. Their message was to challenge the status quo and question why teaching and examining methods have not changed, despite the changes in technology now available. Also, it is clear that our messaging to young people can appear confused and often contradictory. While debate is essential to a learned society, we must ensure that the outcomes of this are accurate and consistent.

Another key discussion was the use of AI and its emergence in aerospace. AI is not as new as some may think, having existed for decades, but it has come to the fore with current computing capability. The inevitable fact is that AI will replace some roles and jobs. However, it will create other opportunities, roles that we have not yet envisaged. The use of AI to bring increased efficiency, better energy management and a safer environment is enticing. Ignoring it is not an option and embracing its potential whilst understanding its weaknesses is essential.

Ahead of the President's Conference – and in the week of World Mental Health Day – we hosted our own Mental Health in Aerospace awareness event at No.4. The event was a timely opportunity to bring our community together to focus on mental health and wellbeing across the sector. While there has been increasing acknowledgement of the importance of psychosocial risk management and mental health support, there is still a lot to be done. Together with our expert speakers, our event

▲ The President (centre) with (L-R) EASA Head of Sustainability & Global Outreach, David Solar, RAeS Public Affairs Executive, Jordan Penning, EASA Executive Director, Florian Guillermet and EASA Director of Safety Management, Maria Ruedaat EASA Headquarters in Cologne during the EASA Safe 360 Conference.
via Jordan Penning/RAeS

aimed to raise awareness, share experiences and highlight the resources and support available within aerospace. By starting conversations, learning from best practice and engaging with expert perspectives, we will encourage a culture where mental health is recognised, understood and supported as much as physical health. The event was an outstanding success with the Bill Boeing lecture theatre at near capacity and a similar number of attendees online, demonstrating how important this subject is to us all.

One of the key messages I took from the Mental Health in Aerospace presentations was the fact that loneliness is a bigger problem for the health sector than smoking. Given the change in our working patterns, working from home, night shifts, lone working, etc, this is a sobering thought and one we should not ignore. By recognising the issue, we take an important step towards ensuring our people have the right support and working environment to keep us performing well in a high-performance, safety-critical sector.

It was a privilege for RAeS Public Affairs Executive, Jordan Penning and I to meet with the EASA Executive Director Florian Guillermet, Director of Safety, Maria Rueda and David Solar, Head of Research and Innovation. We had a most productive and wide-ranging discussion, not surprising on the topic of safety, which concluded with our expressed wish to work together for the benefit of the aerospace community. There is a significant synergy between our organisations and sharing position papers and research outcomes will allow us to pursue best practice.

Finally, a huge thank you to the Bedford branch for hosting me recently and giving me the honour of presenting the Sir John Charnley Lecture. This completed the double with unveiling an RAeS heritage plaque at the Farnborough Hub to Sir John in August.

OUR CHIEF EXECUTIVE OFFICER

David Edwards

> However you contribute, please know that it helped us secure this award

As always, reading *AEROSPACE* at this time of year brings the list of those members who have been with us 50 years (see *AEROSPACE* October 2025 p56). This is an incredible period of time dedicated to the Society, as members, volunteers and supporters. I am always delighted to receive letters from our members reflecting on their half century with the Society. We could not have achieved what we have without you, your efforts and your support. My thanks to you all and please remember the aerospace greats who have been before you and in whose footsteps you tread.

I'm delighted to report that the Society was Highly Commended in the Memcom Awards this year, in the category for Best Professional Body. We were up against some stiff competition from across the membership world, so it is nice to have been placed in such esteemed company. Again, the Society can only do this by delivering solid output so, however you contribute to our work, please know that it helped us secure this award.

As we head into autumn, the time comes to consider whether you could help the Society's work (in our 160th year) as a member of our Council. Council steers the course of what we deliver and how we deliver it and meets (in hybrid) four times a year, together with some additional work in between. Likewise, we will have a vacancy to serve the Society as one of our Trustees from the May 2026 AGM. Please scan the QR code (left) to find out more about this opportunity.

Aside from the budget weeks, which took me away from column writing last month, it has been a busy time for the various boards and committees in the Society. Our Specialist Groups came together in October for their biannual meeting where they discussed areas of collaboration, best practice and highlighted areas that the Society, and our External Affairs team, should be considering for the meetings we have across government and with other regulatory bodies. Then came the refreshing President's Conference (see p30) which brought to light the people at the heart of our aerospace community. As we move towards the end of the year, we have our Medals and Awards ceremony on the 26 November, highlighting brilliant work from across the sector. I am particularly looking forward to welcoming the UK's aerospace charities to our symposium on 1 December, looking at how we can collaborate better for increased impact. If you have not yet signed up, but lead a charity, CIO or trust in the space, please join us for what is set to be an exciting and inspiring day.

Please email events@aerosociety.com to register.

▲ Members of the RAeS team at the Memcom Awards on 25 September. via Memcom

COUNCIL ELECTIONS 2026

Would **you** like to help guide the Society?

The Society would like to hear from members who are interested in standing for Council in the 2026 elections. The Council represents all the aerospace sectors and provides critical input to the Board of Trustees. To fully represent these sectors, we need candidates from across the industry, whether you're a newly qualified apprentice or a senior engineer, a pilot or a flight operations controller, an astronaut or a mission specialist, a leader in our industries, a consultant or any of the myriad of professionals who support us. We need your skills to enhance our Council.

To become our President, you need to be elected from the Council, by the Council. Our President chairs Council meetings and also serves on the Trustee Board. The President represents the Society at exciting events around the world, visits as many branches, divisions and corporate partners as possible, and uses their experience, knowledge and skills to improve the influence and standing of the Society. The monthly message from the President describes some of the range of activities and initiatives that they do on behalf of the Society.

If you are able to donate your time and expertise you will gain the opportunity to take part in interesting debates on issues affecting our sectors and the Society. You will work with other enthusiastic and committed professionals to help shape our future direction and it's a great opportunity for professional development and to enhance your CV. If you wish to, you will also have the opportunity to get further involved in other roles at the Society.

If you are interested, require further information or wish to apply please visit: **mi-nomination.com/raes2026**

Please note that all nominations must be submitted no later than 31 January 2026 at 23.59 GMT.

Book Reviews

HAWKER'S BIZJET

Hawker: The Great British Business Jet

Bruce Leatherbarrow

Air Britain 2025, Volume 1: Hardback, 160pp, colour. Volume 2: 144pp, black and white. £40 for Air-Britain members and £60 non-members

It is timely that Air Britain has published an excellent book on the 125, as the type has received insufficient recognition from aviation writers.

The book's title is slightly off-putting as I am not sure many British readers would refer to a 125 as a Hawker. Bill Gunston's fine 1996 book, *Hawker, the Story of the 125*, successfully manoeuvred around this issue. Over the decades the 125 underwent various changes of name and ownership. It first flew as the de Havilland DH.125 in 1962 even though the company had been taken over by Hawker Siddeley Aviation in December 1959. From 1963 it became the HS.125 and, with nationalisation in 1977, it became the BAe 125. After the sale of the programme to Raytheon in 1993, the 125 was renamed the Hawker (so the BAe 125-800 became the Hawker 800). In March 2007, Raytheon sold it to Hawker Beechcraft.

The author has ably laid out the story of the development of the 125 in detail. In March 1961, work began at Hatfield on designing a jet replacement for the de Havilland Dove and this proved a sound move as in the succeeding five decades 1,729 125s were delivered. Production only ceased in the US following the bankruptcy of Hawker Beechcraft in 2012. Despite a strong order book in May 1992, BAe decided that the 125 was not a core product, as it did not fall neatly into its civil or military aircraft portfolios, and put the programme up for sale. It determined that any further development would be costly and risky, besides which it had already written off £1bn on its 146, ATP, Jetstream programmes which had failed to sell in sufficient numbers. (In contrast, Dassault's Falcon executive jet range, first flown in 1963, is still selling in 2025.) After its sale to Raytheon in mid-1993, final assembly continued at Broughton in Cheshire until April 1997, after which the main structural components were shipped to Wichita, US for assembly.

◀ The prototype de Havilland DH.125 Dragon Jet. NAL/RAeS

The book's nineteen chapters not only examine the type's development and ownership but also the special missions' variants, production and support (an aspect of an aircraft's history frequently ignored by authors), civil and military operators, accidents and mishaps, as well as scrapped and preserved examples. In addition, there are seven appendices covering series' variants, layout drawings, technical details, performance, accidents, preserved aircraft and other salient information.

This large format hardback book is beautifully produced on high-quality paper with many full colour photos. A drawback is the price as it can only be purchased together with a separate 148pp large format, softback production list. Though one expects an Air Britain aircraft history to include a detailed production list – and it is an invaluable component – it may well prove a hindrance to sales.

Despite this reservation, I strongly recommend readers to purchase this excellent history of the 125, or do I mean the Hawker?

Stephen Skinner

FROM THE ARCHIVE

First flying in November 1943, the Grumman F7F Tigercat was developed as a carrier convoy fighter but found niches in the night fighting and reconnaissance roles. A pair of 2,100hp Pratt & Whitney R-2800 Double Wasp 18-cylinder radial engines powered the F7F to 400kts in level flight and, while mostly delivered too late for service in WW2, early examples from VMP-354 arrived in Okinawa in July 1945 and were used to photograph potential invasion beaches. Tigercats found a post-war role as waterbombing aircraft and eight remain airworthy in 2025 as civilian-owned 'warbirds'.

For daily historic aviation content see the 'On This Day in History' feature on the Society's Facebook and LinkedIn pages.

Obituary

ROGER BEAZLEY

Ben Dunnel/BADA

FRAeS
1941-2025

Roger Beazley passed away on 15 September at the age of 84.

Roger was among the most prolific, experienced and valued contributors to the British air display scene in different roles for many decades. He learned to fly on a Thruxton Jackaroo and instructed on gliders for the Air Cadets, before joining the RAF and flying the Lightning and Phantom operationally. For two years he was an RAF Phantom display pilot.

Qualifying as an experimental test pilot in 1973, the majority of his service career thereafter focused on experimental, research and development flying. Roger's final military appointments included a posting as the last head of experimental flying at RAE Farnborough and another as Director of Flying (Research and Development) within the MoD.

Among his very notable assignments as a test pilot were an evaluation of the then-new F-15 Eagle and, much later, a round-the-world flight in the RAE's Comet 4, shortly before its retirement. When he left the RAF, Roger continued as a consultant and aerospace adviser to the MoD at Boscombe Down. He also carried on flying light aircraft for many years, ending up with approximately 7,000 flying hours in some 150 aircraft variants.

Notching up in excess of 25 years' involvement in the flying supervision of air displays, Roger was display director at the Farnborough Airshow for 12 of those, a position for which his test-flying experience at home and abroad, knowing many of those who would demonstrate aircraft at the SBAC show, rendered him ideal.

He acted in advisory capacities both at the Dubai Airshow and Asian Aerospace in Singapore. He also supported many UK airshows, including the Royal International Air Tattoo – at which he became chair of the flying control committee – together with IWM Duxford, East Fortune and many events overseen by TSA Consulting, such as the Malta International Airshow.

Roger was a fellow of the Royal Aeronautical Society and the Society of Experimental Test Pilots in the US, and an honorary member of the Flight Test Society of Australia. He was decorated with the Air Force Cross in 1978 and was appointed CBE during 1996. On behalf of the British Air Display Association (BADA), Roger was a representative on the CHIRP (Confidential Human Factors Incident Reporting Programme) board as an air display expert.

He cared deeply about flying display safety and brought great attention to detail to everything he contributed to the field, born of his immense experience, as well as much humour and kindness.

Ben Dunnell

Society News

AMY JOHNSON NAMED LECTURE

In 2025, the Women in Aviation and Aerospace Committee (WAASC) has delivered a strong programme of events and initiatives, continuing its mission to advance gender equity and inclusion across the sector.

A highlight was the annual Amy Johnson Named Lecture, sponsored by Rolls-Royce. This year's lecture, which took place at No.4 Hamilton Place on 18 September, was titled 'MRO Through the Ages and Beyond: Safeguarding Legacy Aircraft Through to AI Wings' and was delivered by Smriti Hamal, Senior Air Safety Consultant at AtkinsRéalis.

For the first time, the lecture included a panel discussion exploring how evolving technologies, such as digital transformation and AI in safety systems, are reshaping the industry, while also highlighting the importance of accessibility and inclusion in designing the next generation of aircraft.

For 2026, the International Women's Day Conferences 2026 will take place on 6 March at RAeS HQ in London and on 10 March in Paris. The theme for 2026 is 'Give to Gain', focusing on how collaboration, allyship and shared responsibility drive lasting change across the aerospace sector.

▶ The panel discussion included Verity Richardson, Negin Asadi, Katharine Syfret, Leah McDowell, Dan Plant and keynote speaker, Smriti Hamal.
Vivaldo Victor/RAeS

Members can stay updated on WAASC and ED&I initiatives by visiting the RAeS website. Together, we can accelerate action and drive meaningful change across the industry.

Vivaldo Victor
ED&I Officer

Society News

ROTARY WINGED LESSONS FROM THE PAST

Early British pioneers of rotating wing flight, both amateur and professional, kept their interest alive at informal, and usually impromptu, gatherings. However, with great advances made in the field in the WW2 period, the Helicopter Association of Great Britain (HAGB) was formed in 1945 – and later absorbed into the Royal Aeronautical Society, becoming the rotorcraft section in 1959.

Now the HAGB papers are viewable online for the first time via the National Aerospace Library.

When you read the archives, what you really see is how many of the challenges are consistent with today. Back in 1948 the HAGB held a day of discussion about the "general problems of the helicopter for civil use." Naturally its focus was upon operational and technical issues but in terms of the financial elements, the papers say: "The economics of helicopter operation are at present such as to preclude consideration of other than highly specialised uses, a limitation which arises from high initial cost, and low payload capacity... the solution as far as the human anatomy is concerned appears to be in the development of bigger and better helicopters... for a preliminary study based on current practice indicates the possibility of effecting an appreciable reduction in costs per passenger mile and to a level more in line with accepted standards, with a 12-14 seater type of helicopter."

It begs the question of how different things are today, be it concerned with acceptable costs, standards or practices? As you can read about in the HAGB journals, the Fairey Gyrodyne had world-beating speed, Bristol 171 the first helicopter certified for civilian use in air/sea rescue, cargo, passenger transport or air ambulance and the Cierva Air Horse was conceived as a crop sprayer for the Tanginika groundnut scheme. The marketing brochures for these would have given the exact same rationale as today's compound helicopters, eVTOL or other air mobility projects.

British European Airways began commercial helicopter airmail services in 1948 and via the archive you can get an insight to the preparatory work and thinking that went into bringing this to life (and its continued operation) via Mr N E Rowe, BEA's Controller of Long-Term Research and Development. In *The Journal of the Helicopter Association of Great Britain* Volume 3 Issue 1 (June 1949) he wrote:

"We recognise that it is a comparatively short-range vehicle up to, say, 250 miles. In fact, it is at such ranges that it offers its most effective contribution to existing means of transport in this country. At longer ranges the advantages tend more and more to the fixed-wing aircraft, which is able to make increasingly effective use of its much greater cruising speed. Short-range operation introduces a number of most significant factors. Firstly, it demands a very high standard of regularity and punctuality. Secondly, such short stage transits invite the closest comparison with normal means of surface transport in safety, regularity, economy, comfort and convenience. Thus, to become effective, helicopter operations in a country like ours must be no more affected by meteorological conditions than is surface transport – this is a fundamental requirement.

▲ Westland Sikorsky S-51, G-AKCU, of BEA leaving after loading mail at Mudford near Yeovil in 1948. NAL/RAeS

> The marketing brochures for these would have given the exact same rationale as today's compound helicopters, eVTOL or other air mobility projects

A third most important factor depending on short-range operation is the relatively large number of rotor stations needed. Since each must be equipped to the standard needed for regular and punctual operation in all conditions, including night operations, the equipment needed must be simple, cheap and economical in cost and manpower for operation and maintenance."

The problems faced by BEA (which ultimately ceased helicopter operations not because of technical limitations but because of economics), the hope in the trajectory of progress and change from those pioneering years, just failed to materialise. Is there little difference to current conversations around the application of eVTOL from those of inner-city helicopter operations in the 1940s?

Our collective challenge is actually less about the aircraft and more about challenges of environment and infrastructure – both of which require state sponsorship to achieve sustained growth, further investment and success. Let us not forget that Battersea Heliport, still the only rotary winged link to London, opened in 1959.

You can now enjoy those original bulletins in the online archives, thanks to a triumph of foresight and great effort to digitise documents that provide insights into our rich aeronautical history. We should give great thanks to the team at the Society for giving us that opportunity.

To explore the HAGB papers, members need to visit the Society's e-library at www.aerosociety.com/elibrary and select The Aeronautical Journal Archive.

Phil Bennett ARAeS
Rotorcraft Specialist Group

Diary

EVENTS

4 November
Loughborough Branch: The life and times of FLYBY Technology
Annalisa Russell-Smith FRAeS, Chief Strategy Officer, Flyby Technology
Brockington Building, Margaret Keay Rd, Loughborough LE11 3TU

5 November
Careers in Aerospace and Aviation Live 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

5 November
RAeS and Stratasys Webinar: Engineering Agility in Aerospace and Defence: From Design to Deployment
Greg Flanagan, Additive Manufacturing Operations and Engineering Manager, Technology & Capability, BAE Systems Air FalconWorks and Matt Jones, Defence Technical Lead EMEA, Stratasys.
Online

5 November
Weybridge Branch: Life in the Cockpit from Grasshopper to Harrier
Group Captain Chris Burwell MBE RAF (retd)
Brooklands Museum Clubhouse, Brooklands Road, Weybridge, Surrey KT13 0QN

6 November
Hamburg Branch: Challenges and solutions for the use of AI algorithms in aviation
Frederik Mattwich, Product Manager for Cognitive Electronic Warfare, Helsing
Helmut-Schmidt-Universität - Universität der Bundeswehr Hamburg, Holstenhofweg 85, 22043 Hamburg

10 November
RAeS Light Aircraft Design Conference 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

10 November
Prestwick Branch: The Impact of the RAF on a Highland Glen – Personal Stories
Cameron Paterson
University of the West of Scotland, Ayr Campus, University Avenue, Ayr KA8 0SX

11 November
RAeS Rotorcraft Conference 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

11 November
RAeS Cierva Named Lecture 2025
Cyril Heckel, Next Generation Rotorcraft Capability Programme Manager, NSPA
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

11 November
Hamburg Branch Gerhard Sedlmayr Lecture: Delivering Safety Safely – Proportionality and Pragmatism
Helen Summers MRAeS, Principal Safety Consultant, SQEP
Goldene Zeiten, Harvestehuder Weg 48, 20149 Hamburg

11 November
Southend Branch: Air Cadets and Air Shows
Capt George Capon
Holiday Inn, Southend Airport SS2 6XG

11 November
Farnborough Branch: The Extraordinary Life of Air Cdre E Howard-Williams MC
Anthony Inglis Howard-Williams
Farnborough College of Technology, Boundary Road, Farnborough GU14 6SB

12 November
Preston Branch: Young Persons' Network Mini Lecture Competition, Venue TBC

12 November
Chester Branch: Hydrogen powered drones
Jonathan Douglas-Smith, Co-founder and Commercial Director, Skycutter
Broughton Wings Club, Chester CH4 0NQ

12 November
Marham Branch: Arctic Operations (Part 2)
Marham Village Bowls Club, Coronation Playing Field, King's Lynn PE33 9JQ

12 November
Brough Branch: Embedding Conscience in Drones and Robots?
Dr Rashid Ali FRAeS
Cottingham Parks Golf & Leisure Club, Woodhill Way, Cottingham HU16 5SW

13 November
Munich Branch: The Eurodrone Programme
Sascha Hapke
TUM Campus Garching, MW 1801, Boltzmannstraße 15, Garching bei München

13 November
Manchester Branch: Faster than a speeding bullet – Lockheed's SR-71
Paul Crickmore
Lecture Theatre B, Roscoe Building, University of Manchester M13 9PL

18 November
Celebrating LGBTQ+ People in STEM 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

18 November
Loughborough Branch: UltraFan Demonstrator – First Engine to Test
Brockington Building, Margaret Keay Rd, Loughborough LE11 3TU

18 November
Oxford Branch Sadler Lecture and Dinner: UltraFan – the next generation gas turbine engine
Dr Jeremy Hughes FRAeS, Head of Demonstrator Programmes, Research & Technology, Rolls-Royce
Wolfson College, Linton Road, Oxford OX2 6UD

19 November
Hatfield Branch: Sporting and recreational aviation, regulatory survival and the future of General Aviation airfields
Mike Pearson, Popham Airfield Manager
Room A161, Lindop Building, University of Hertfordshire, Hatfield AL10 9AB

20 November
Birmingham, Wolverhampton and Cosford Branch: Stalin's Night Witches
Debbie Land
RAF Museum Midlands, Shifnal TF11 8UP

24 November
RAeS Aerospace Medicine Group Annual Symposium 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

24 November
RAeS Stewart Memorial Lecture 2025
Prof David Newman, Visiting Professor of Aerospace Medicine at King's College
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

28 November
RAeS Young Persons' Networking Reception 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

3 December
Weybridge Branch: 70th Rex Pierson Lecture: Another giant leap for mankind
Padhraic Kelleher FRAeS, UK CAA Senior Adviser
Brooklands Museum Clubhouse, Brookland Road, Weybridge KT13 0QN

3 December
North Wiltshire Branch: Hydrogen and aerospace
Nathan James, Chief of Aerostructures, Cranfield Aerospace Solutions
The Deanery CE Academy, Swindon SN1 7DA

4 December
RAeS Wilbur and Orville Wright Named Lecture 2025
Dr Michael Winter, Chief Scientist, RTX
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

8 December
Prestwick Branch: Taking Part in the 'Pooleys Dawn to Dusk' Competition
Derek Pake
University of the West of Scotland, Ayr Campus, University Avenue, Ayr KA8 0SX

9 December
RAeS Corporate Partner Christmas Reception 2025
Royal Aeronautical Society HQ, No.4 Hamilton Place, London W1J 7BQ

9 December
Loughborough Branch: Buccaneer through the archive
Speaker TBC
Room U0050, Brockington Building, Loughborough University, Margaret Keay Rd, Loughborough LE11 3TU

For further information and booking, visit **aerosociety.com/events-calendar/**

Elections

FELLOWS

Alaa Ashour
Amzar Azizan
Martin Bransby
Andrew Coe
Kathryn Evans
James Goodwin
Daniel Graham
Gary Hand
Simon Hardiman
Chris Hope
David Herschell
Matthew Hicks
Glenn Hogben
Balasundarampillai Janagan
David Marsden
Richard Molloy
Michael O'Brien
Christopher Smallhorn
Limhi Somerville
Derek Stafford
Johnny Stringer
Andrew Taylor
Adam Wardrope
Ashley Whitcher

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Fathi Al-Musmari
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Mark Bean
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David Bentley
Raul Bonadia Rodrigues
Christopher Bowley
Josh Bricker
Shaun Brockhill
Paul Bryant
Thomas Bustin
Eduardo Castro
Mohammed Fazil Chalil-Kizhakke-Thalapil
Philip Chandler
Timothy Clark
Mark Clayton
Matthew Edgley
Anthony Fairhurst
Michael Firth
Davide Galie
Jonathan Roy Greig
Huaiyuan Gu
Justin Hassett
Bjoern Hennig
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Aaron Hopkins-Bain
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Yazan Mansour
Benjamin Mark
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Timothy McEwan
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Uriel Rivera
Bright Sablah
Muhammad Haad Shaikh
Yik Hei Myron To

WITH REGRET

The Royal Aeronautical Society announces, with regret, the death of the following members:

Roger Huburt Beazley FRAeS 84
Christopher Hamar Chambers FRAeS 85
Anthony William Davis MRAeS 69
Gordon Leonard Hill MRAeS 85
Graham Place ARAeS 75
Bruce Henry Prescott FRAeS 85
Ashley Roger Roffey MRAeS 83
Dr Louis Gerald Stafford FRAeS 83
Stewart Cameron Stevenson FRAeS 75

New Member Spotlight

CALLUM SMITH

Name: Callum Smith

Grade: Associate Member

Age: 23

Location: Wimborne, Dorset

Job title: Senior Engineer – Field Service Engineering at Mission Systems Division, Eaton

What inspired you into aerospace? I always had an interest in aviation from a very young age. A big contributor towards this interest was the Bournemouth Air Festival. Having attended every single one of the events with my family, the breathtaking aerobatics and displays made my passion and interest in aviation stronger year after year. Growing up with such an event on my doorstep really drove my passion for the industry of aerospace and aviation.

What's the best thing about your current role? Within my role, I get to travel around the world servicing and maintaining air-to-air refuelling products, as well as training end users on how to safely operate, maintain and service these important products. If you had told me when I was younger that I would have the authorisation to release these back into service – especially at 23 – as well as getting to see the world, I would not have believed you.

What made you join the RAeS? I wanted to join a professional institute for a couple of reasons. The first being that I wanted to develop my professional profile and stand out to potential professional connections. The second was the ability to network across many different platforms, speaking to people who are in similar roles and industries to learn more about the aerospace industry. Finally, being part of a professional institute helps pave the way to becoming a professionally recognised engineer, something that would help me to validate that the skills and experience I have gained are professionally recognised.

What do you hope to get out of your registration with the RAeS? The first thing would be to gain professional registration. This is great for me to show my skills and knowledge are professionally recognised. Secondly, I hope to be able to share my experiences and, hopefully, influence my colleagues and wider connections in the industry to become professionally registered engineers. Finally, I'd like to be able to grow my already wide network of professional connections, allowing me to gain a broader understanding of the industry I work within. Making professional connections can create many opportunities and allows me to become more involved in the aerospace industry.

What three items would you take with you to the space station? Firstly, I would take a camera. This is probably many people's choice but I too would love to be able to capture some of those incredible sights we see astronauts post online. The second item would be a torch/flashlight – it is a handy tool and you never know when you might need a source of light. The third item would be an e-reader. I would love to be able to unwind by reading books (particularly autobiographies) by people in the aerospace industry talking about their careers and experiences throughout their life.

Who is your biggest inspiration? My biggest inspiration is my mother. As a single parent who brought me up since I was six months' old, I remind myself daily of the commitment and determination that she has shown me. From working 8-6 daily to studying part-time for a Foundation Degree, I am massively inspired by her. The love and support that she has given me towards my hobbies and career path is simply too much to put into words. Every day, I strive to do my best to continue to make her proud and exceed her expectations.

Piece of advice for someone looking to enter your field? I would say make sure to work hard, stay focused on what you want to do and don't give that dream up for anything or anyone. Sometimes, things just don't work out and other options become available and working hard and having the right attitude shows that you are committed to bettering yourself and others around you. Learn whenever and wherever you can. Take advice not as criticism but as a way to improve yourself and learn from others more experienced in your field. Nobody knows everything and we all have something to give.

Correction: In the last month's New Member Spotlight, Charlotte Hall ARAeS' advice to someone looking to enter her field was inadvertently missed. We are pleased to include it in full here:

Piece of advice for someone looking to enter your field? Cultivate your passion and curiosity and continue to challenge why things are the way they are. I believe the most successful people are those who are constantly seeking new knowledge so keeping that desire to continuously bolster your learning is essential in a field which is ever evolving. As a woman in engineering, I have learnt that my voice and opinions serve as a unique perspective and are not just a valuable addition to the team but can also contribute to being a powerful driver of innovation too. In short, never lose your sense of wonder or desire to take things apart and understand how they work, and always challenge why. That curiosity is the true engine of innovation in this field and I believe the foundation upon which all innovation is built.

The Last Word

COMMENTARY FROM

Professor Keith Hayward
FRAeS

Aero vandalism

> I AM NOT SO IDEALISTIC TO IMMEDIATELY EMBRACE CHINA IN THE EFFORT, GIVEN THE POSSIBLE SECURITY ISSUES RAISED BY COLLABORATIVE RESEARCH, BUT SUFFICIENTLY HIGH FIREWALLS MIGHT BE RAISED TO MAKE IT A TRULY GLOBAL EFFORT

Founded in 1915, the National Advisory Committee for Aeronautics (NACA) was remitted to undertake, promote and institutionalise US government-funded aeronautical research. Its pioneering work included much of the early advances in supersonic flight, including the Bell X-1. Mutating into NASA (National Aeronautics and Space Administration) in 1958, largely as a response to the Soviet Sputnik and the need for a civil sponsor for space research, over the years the 'first A in NASA' has often been neglected in favour of the big budget space programmes.

Past signs of progress

There were signs earlier in this century of a revival in aeronautical research (an earlier surge in promoting the 'first A'), highlighted by the Sonic Cruiser, that fizzled out. The 2016 uptick was part of the New Aviation Horizon programme with a focus on tackling aviations' growing environmental challenge. The budget nearly took the 'first A' back to a $1bn high. However, the latest round of US budget allocation lops $346m, a 36% cut from $620m.

The EU is currently putting some $4.6bn in its 10-year public-private partnership Clean Aviation initiative, aimed specifically at reducing aviation's climate change impact. The UK alone is set to deliver £975m in R&D support for green research in the aerospace sector over the next five years. The details of the NASA budget are not yet known, but penny to a dollar, the main hit will be on the 'greener' aspects of federal R&D. It also looks like an end of the road for several X projects, also linked to low-zero emission research.

Climate change as the electric third rail in Washington

The White House, with the President volubly in the lead, is well known for harbouring climate change deniers on a heroic scale and the worst can be expected. Cuts to electric propulsion might be on the cards, but this may be saved if it can demonstrate a 'transactional value' in terms of commercial exploitation. The same reasoning might be attached to the low sonic boom supersonic ambitions, which may first emerge into the 'far from environmentally sound fast business jet' or high-value passenger travel. The aeronautical budget may also have to do some of the heavy lifting on modernising the ailing US air traffic control system. However, the driving force of this level of R&D is not necessarily the delivery of immediately realisable commercial returns.

A missed global opportunity

I have long advocated for a global approach to climate change mitigation; somewhat naively perhaps, if there was even a sniff of commercial advantage in delivering the goods. It would be better though if Boeing, Airbus and the three dominant aero-engine firms work together to avoid duplication and spread best practice. I am not so idealistic to immediately embrace China in the effort, given the possible security issues raised by collaborative research, but sufficiently high firewalls might be raised to make it a truly global effort.

I suspect this only adds to the disincentive seen from parts of Washington DC; collaboration with Europe and China is getting dangerously close to oxymoronic status there, and it might prove more than a touch challenging to advocate for the importance of 'global commons' in the current climate.

There is a history of important aeronautical achievements coming out of federal laboratories and programmes that are of benefit generally and to the world of aviation. The same is increasingly the case in the output of European research. This is a pool of knowledge for general benefit; it is far from the 'transactional' relations that drive current American policies. In a four-year political cycle, the wheel of change might lead to a more positive climate, but sadly, this might not be until there is another occupant in the White House and a more positive view of green R&D.

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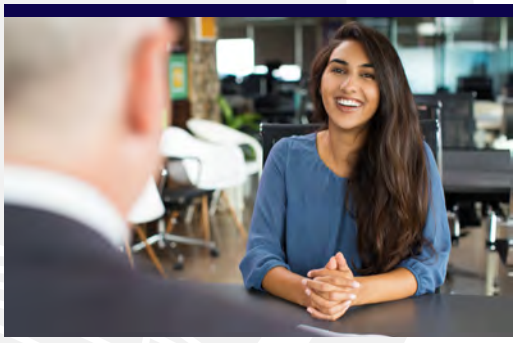

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